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Explorations in Alaska, 1899

United States. Adjutant-General's Office.
Military Information Division, Joseph Sutherland Herron

60th Congress, 2d Session } SENATE { Document No. 689

WAR DEPARTMENT, - - - ADJUTANT GENERAL'S OFFICE.

No. XXXI.

EXPLORATIONS IN ALASKA, 1899,

FOR

AN ALL-AMERICAN OVERLAND ROUTE FROM COOK INLET, PACIFIC OCEAN, TO THE YUKON.

BY

First Lieut. JOSEPH S. HERRON, 8th Cavalry,
COMMANDING EXPEDITION.

MARCH, 1901.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1909.

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WAR DEPARTMENT.

ADJUTANT GENERAL'S OFFICE.

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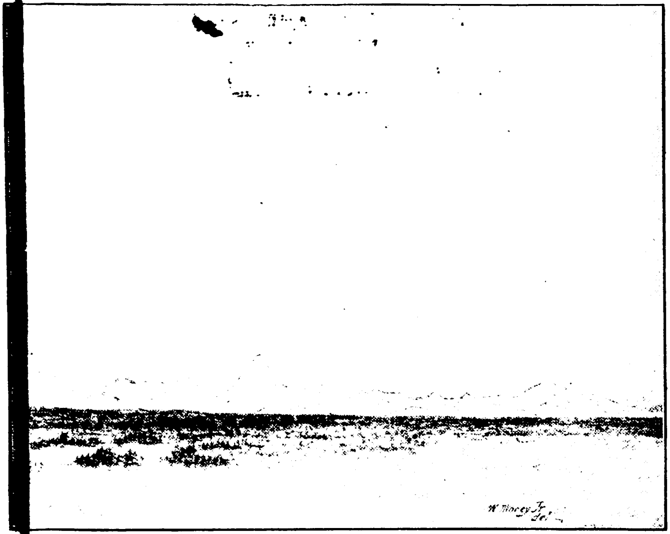
Resolved, That 3,000 copies of "Explorations in Alaska, 1899, for an all-American overland route from Cook Inlet, Pacific Ocean, to the Yukon," by First Lieut. J. S. Herron, Eighth Cavalry, commanding expedition, War Department, Adjutant-General's Office, Document No. 138, Military Information Division, be printed for the use of the Senate.—S., Jan. 29, 1909; *S. Doc. 689.*

Checked
May 1913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LETTER OF TRANSMITTAL.

WASHINGTON, D. C. *February 25, 1901.*

THE ADJUTANT GENERAL UNITED STATES ARMY,
Washington, D. C.

(*Through commanding officer Military Information Division.*)

SIR: In compliance with orders I have the honor to submit herewith the report of my explorations in Alaska, with the following inclosures:

1. Sketch of route of Portage Bay detachment, May, 1899.
2. Map of route explorations from Cook Inlet to the Yukon via the Kuskokwim country.
3. Sketch of the McKinley Range.
4. Sketch of Simpson Pass.
5. Sketch of dog harness and sleds.
6. Miscellaneous.
7. Index map of Alaska.
8. Photographs illustrating the nature of the country, different kinds of transportation, and groups of Indians.

This report represents the earnest efforts of a small party in unknown regions against extraordinary obstacles, deserted by guides, caught by winter, deprived of transportation, and hampered by scarcity of food.

I take pleasure in commending to the Adjutant General the men of my expedition. Acting Asst. Surg. Henry R. Carter, U. S. A., a young physician of ability and attainments, in addition to conscientious professional work, did duty at all other tasks assigned to him with pluck, zeal, and energy, and contributed much to the success of the expedition. Privates Sam L. Jones, Company D, Fourteenth Infantry, and Gilbert Dillinger, Company E, Fourteenth Infantry, proved themselves on every occasion most magnificent soldiers in every respect.

These two soldiers distinguished themselves in the service while serving under my command on this duty.

Packers E. M. Webster and George Brown contributed greatly to the success of the expedition by their ability as horsemen and packers, as well as by their faithful, energetic, and intrepid services throughout.

Very respectfully,

JOSEPH S. HERRON,
First Lieutenant, Eighth Cavalry,
Commanding Expedition.

General Orders, No. 51.

HEADQUARTERS OF THE ARMY,
Adjutant General's Office,
Washington, *March 20, 1899.*

The following orders have been received from the War Department:

War Department, Washington, *March 17, 1899.*

* * * * * * *

II. A military expedition for exploring purposes in Alaska will be organized as follows, and known as Cook Inlet Exploring Expedition, and will be announced in orders:

1. Capt. Edwin F. Glenn, Twenty-fifth Infantry, commanding:

* * * * * * *

One acting assistant surgeon, one commissary sergeant, Sergt. William Yanert, Eighth Cavalry; and one sergeant, one corporal, eleven enlisted men, of whom five shall be cooks, and two privates of the Hospital Corps, fully equipped and supplied to November 30, 1899, will proceed to Tyoonok, Cook Inlet, Alaska, on or about the 15th proximo, and there establish a camp and depot. The expedition will disembark en route a small detachment at Portage Bay, Prince William Sound, Alaska, to explore, survey, establish, and mark the trail from that point to the camp now located at the head of Knik Arm. From the permanent camp at Tyoonok, Alaska, detachments will be sent to explore the country to the northward via the Matanuska, Suchitna, Yentna, and Kuskokwim rivers, for the most direct and practicable route from tide water to the crossings of the Tanana River; and from these crossings northward to the military posts established on the Yukon River, at Rampart and Circle City. One detachment will explore the west bank of Cook Inlet from open tide water to the head of navigation of the Suchitna River for the most practicable overland trail.

The district of exploration for this expedition will be via the routes indicated and bounded on the north and west by the Yukon and Koyukuk rivers and on the east by the Copper River.

2. This expedition will cover as much territory as possible and will collect and incorporate in the reports all information that may be valuable to the development of the country explored regarding topographical features, available routes of travel, feasible routes for railroad construction, appropriate and available sites for military reservations, adaptability for agriculture and stock raising, mineral resources, timber, fuel, food products, and the stock best suited for food and transportation purposes; the number, location, and condition of the natives of the territory explored. Maps and photographs will accompany all reports.

3. The routes traversed by this expedition should be definitely located and properly marked in order that they may be known and used as routes of travel by the public.

4. The commanding officer of the expedition is authorized to employ the necessary Indians, natives of Alaska, for duty with the expedition as guides, for such periods of time as may be necessary.

The Quartermaster's Department will furnish the necessary transportation.

G. D. MEIKLEJOHN,
Acting Secretary of War.

BY COMMAND OF MAJOR GENERAL MILES:

H. C. CORBIN,
Adjutant General.

SPECIAL ORDERS, No. 93.

HEADQUARTERS OF THE ARMY,
ADJUTANT GENERAL'S OFFICE,
WASHINGTON, *April 21, 1899.*

* * * * * * *

78. By direction of the Secretary of War, Second Lieut. Joseph S. Herron, First U. S. Cavalry, now at Fort Niobrara, Nebr., is detailed for duty with the Cook Inlet Exploring Expedition, organized in accordance with General Orders, No. 51, March 20, 1899, from this office, and will proceed at once to Seattle, Wash., and report to Capt. Edwin F. Glenn, Twenty-fifth U. S. Infantry, commanding expedition. The travel enjoined is necessary for the public service.

BY COMMAND OF MAJOR GENERAL MILES:

H. C. CORBIN,
Adjutant General.

EXPLORATIONS IN ALASKA, 1899.

SUMMARY OF REPORT.

PRELIMINARY OPERATIONS.

I reported for duty to Capt. E. F. Glenn, Twenty-fifth Infantry, commanding the Cook Inlet Exploring Expedition, at Seattle, Wash., April 30, 1899.

The expedition sailed for Tyoonok, Alaska, May 3, 1899, on the S. S. *Excelsior*.

May 13, 1899, to May 30, 1899.—While the main expedition continued on the steamer to the base camp at Tyoonok, I was detached at Orca, Alaska, transferred to the tug *Wallowa*, and debarked in Portage Bay, Prince William Sound, Alaska, to explore a supposititious local route about 75 miles long connecting Portage Bay and Knik Arm, Cook Inlet, Alaska. I arrived at the base camp from this work May 31, 1899.

May 31, 1899, to June 8, 1899.—I was on duty at the base camp at Tyoonok, except June 4 and 5, when I was absent at Knik complying with instructions indicated hereafter.

TRANS-ALASKAN OPERATIONS, JUNE 9 TO DECEMBER 11, 1899.

June 9, 1899, to June 27, 1899.—I was transferred by Captain Glenn on the expedition steamboat *Duchesnay* to Suchitna Station, near the mouth of the Suchitna River, with instructions to remain there till further orders, meanwhile to arrange for Indian guides and collect such information as could be obtained.

June 27, 1899, to June 30, 1899.—I was transported by Captain Glenn on the steamboat to the head of navigation of the Yentna River, hitherto unexplored farther than its junction with the Skwentna River, and to the head of navigation of a branch river designated by the Indians and called by them the Keechatno, hitherto unknown and unexplored; and at the latter point I was landed to begin my overland explorations to the Yukon River, this starting point having been decided upon by the Indians in my consultations with them at Suchitna Station.

July 1, 1899, to December 11, 1899.—I proceeded with my detachment and explored for the most practicable route to the junction of the Tanana and the Yukon rivers, passing through regions hitherto unknown and unexplored, except those portions of the Echeatnu and Tanana rivers lying within my territory, involving, exclusive of side explorations, about 340 miles of travel with a pack train, until winter; then about 171 miles on snowshoes, with dogs and sleds, to the destination designated in my orders.

OTHER OPERATIONS.

December 12, 1899, to May 27, 1900.—The detachment was detained at Fort Gibbon, Yukon River, Alaska, in obedience to orders of the commanding officer, District of North Alaska.

May 27, 1900, to June 29, 1900.—I was en route to the United States via the White Pass and Yukon route.

LIST OF PHOTOGRAPHS AND SKETCHES.

PHOTOGRAPHS.

No. 1. Members of the expedition, Suchitna Station.
No. 2. Old Suchitna Station.
No. 3. Yentna River.
No. 4. First camp on Keechatno River.
No. 5. Head net and gloves, necessary in summer for protection from mosquitoes.
No. 6. Small mosquito-proof shelter tent used in summer.
No. 7. The pack train, near the Chedotlothno Indian village.
No. 8. The pack train, near the mouth of Echeatnu.
No. 9. Natural grass meadow, Nin Hill, Keechatno River. This grass was nearly 6 feet high. The herd can be seen near the center of picture.
No. 10. Looking north from crest of Nin Hill, Keechatno River.
No. 11. View from top of Totcylon Mountains.
No. 12. Headwaters of Keechatno River, Gurney, Lewis, and Augustin peaks in the distance.
No. 13. East entrance to Simpson Pass.
No. 14. Looking south up the Echeatnu Valley from mouth of Tateno.
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No. 16. Looking west across the Echeatnu near its mouth.
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Nos. 19 and 20. Houses at deserted Indian village on Chedotlothno.
No. 21. Cache at same.
No. 22. Ridges between Chedotlothno and Kuskokwim.
No. 23. Shesoie and Minchumina Ivan. Shesoie to the right of the picture.
No. 24. Telida.
No. 25. The Tanana at Coschaget.
No. 26. Ice cakes at the break-up of the Yukon.
No. 27. Indian birch-bark canoe, Yukon River.
No. 28. Indians traveling over the Yukon ice with dog teams.
No. 29. Mail carrier and pack dog, Yukon River.
No. 30. Horse and mule team and police sled on Yukon ice, Fort Gibbon.
No. 31. Mule team hauling logs on Yukon ice, Fort Gibbon.
No. 32. Laps, reindeer, and reindeer sleds.
No. 33. Hand sled with sail, on Yukon ice.
No. 34. Steers and sled, Fort Gibbon.
No. 35. Bacilli; son, Uruska; wife, Barian; and Annisa, of Telida village.
No. 36. Coschaget on Tanana.
No. 37. Hosa's cabin at Coschaget.
No. 38. An old Yukon Indian, who ate his wife and others, some years ago, while out of food and starving in the interior. The Indians say he is living out the lives of his victims, and thus account for his great age.

No. 39. Group of Suchitna Indians.
No. 40. Three Minchumina Indians to the right of picture. Boy to the left, Yukon Indian.
No. 41. Matilda, Koyukuk Indian, to the left of picture, and Jenny and Ellen, Yukon Indians.
No. 42. Liness, interpreter at Fort Gibbon, and wife, Yukon Indians.

SKETCHES.

No. 1. Dog sleds and dog harness.
  Figs. 1 and 2. Basket sleds.
  Fig. 3. Malamute harness.
  Fig. 4. White man harness. The ring 5 inches from collar is for trace of preceding dog.
  Fig. 5. Principle of mortising and lashing struts.
No. 2. Miscellaneous.
  Fig. 1. Indian fish trap of birch sticks.
  Figs. 2 and 3. Sawbuck, made without nails, by wedging.
  Fig. 4. Method of bending sled runners of green birch. After seasoning they retain the bend.
  Figs. 5, 6, and 7. Method of molding snowshoe frames of green birch.
  Figs. 8 and 9. Indian tools, small chisel and knife, for making snowshoes from the rails split with an ax.
No. 3. The McKinley Range.
No. 4. Simpson Pass.

PORTAGE BAY EXPEDITION.

May 13, 1899, to May 30, 1899.—May 13, 1899, I was debarked by Captain Glenn with a detachment, ten dogs, sleds, snowshoes, and ten days' rations at the mouth of Cabin Creek, Portage Bay, Prince William Sound, Alaska, with the following instructions:

PORTAGE BAY, ALASKA, *May 13, 1899.*

Lieut. J. S. HERRON,
Commanding detachment.

SIR: You will take charge of the detachment consisting of one topographer, one assayist, one hospital steward, one packer, and one cook, and proceed from Portage Bay to the Knik Arm.

You will be provided with twenty days' rations and two dog teams of five dogs each.

In going over to the designated point (Knik Inlet) you will follow the trail followed by Captain Kelly during the year 1898.

Upon arrival at Knik Inlet, in the absence of further instructions from me, you will procure transportation from one or the other of the companies engaged in trade at Knik Station and proceed with your detachment to Tyoonok, Alaska, and report to me at the permanent camp at that place. It is especially desirable that, in making this journey, you have your topographer make a reasonably accurate survey of the country passed over, determining the elevation of the mountains with reasonable accuracy, and report upon the location of the principal topographical features of the country, especially the glaciers encountered.

The principal object of this trip is to determine if it is practicable to establish a trail that is feasible as a mail route from Portage Bay to the Knik Arm that will accommodate the Turnagain Arm settlements and the Knik Arm during all seasons of the year.

Before leaving the Portage Bay you will cause your topographer to make an accurate survey of the valley at which you will be landed and cause to be established the necessary permanent landmarks to sufficiently identify the same. You will personally examine the valley referred to and make such recommendation as your judgment may dictate as being for the best interest of the military service to be set aside for a military reservation. You will cause the portion of the valley selected as being best adapted for military usage to be properly designated by metes and bounds.

During the time necessarily consumed in making this survey you will cause your dog teams to be properly harnessed and exercised daily, so as to be in condition to make the journey across the country from the Portage to Knik Inlet.

Very respectfully, your obedient servant,

EDWIN F. GLENN,
Captain, Twenty-fifth Infantry,
Commanding Cook Inlet Expedition.

My detachment consisted of:

- Acting Hospital Steward J. G. Abele, United States Army.
- Private August Fels, Fourteenth Infantry.
- Mr. William Morey, jr., civil engineer, United States Army.
- Mr. Robert Jenkins.
- Packer A. L. Canwell.

After surveying and establishing the corners of the contingent military reservation, which occupied two days, with my party I started over the route under guidance of Private Fels, who had been over a part of it the year before.

I found the snow gone, except on the mountain tops, and travel on snowshoes with dogs and sleds in summer naturally was out of the question; nevertheless, I carried and dragged dogs, sleds, dog food, etc., for half a day in hopes of finding conditions better further on, but they were not, as an advanced reconnoissance to the top of the mountains by myself and Fels demonstrated.

The situation then presented for consideration the following elements: Time, trail, rations, dogs, dog food, dog packs, foot gear, expense, the expeditions to the Yukon, and Captain Glenn's oral instructions that he would expect me by the 30th and to depart from his orders where necessary. Therefore, after mature deliberation, I detailed Morey and Canwell to remain at Portage Bay with the dogs and other property, while I, with Abele, Fels, and Jenkins, started to walk over the route with our backs for transportation of rations and impedimenta, explored it to the second divide, then proceeded to find Captain Glenn to report the situation, and, if still desirable, to return, equipped and rationed, for the exploration of the remainder of the route.

After a very laborious trip by land and water of about 89 miles, I reached Fire Island, in Cook Inlet, with my three men, May 30, 1899. Here I found Captain Glenn on board the steamer *Perry*.

I reported adversely on the route, having seen enough of it to find that it is not feasible. Meanwhile Sergeant Yanert had also reported adversely on it, he having explored a portion of it during the winter.

Arrangements were made for a steamer to stop in Portage Bay and pick up Morey and Canwell, which was done June 10, making a twenty-nine days' exile for them in a desolate spot, living on reduced rations, composed largely of some extra dog food which had been taken along for emergencies, a goose shot by Canwell with a revolver, and clams gathered on the beach. Further explorations of the "Kelly" route were discontinued.

GENERAL DESCRIPTION OF THE ROUTE.

The route begins by running over the top of a 3,000-foot mountain with precipitous slope, and at the time I crossed, covered with an unstable cap of snow; then descends into and through a narrow canyon, passing three glaciers, to Lake Glenn, where the canyon widens, the lake extending across the canyon to the steep mountain sides and being about a mile wide and about 2 miles long. About 4 miles down Twenty-Mile River beyond the lake the route turns west, crosses two more mountainous divides, each about 3,000 feet in height, and descends the valley of Yukla Creek to Knik Arm, thence around the head of the arm to Camp Glenn, in all about 75 miles.

Incidentally on this trip I carried some mail given me by Captain Snow, of the steamer *Wallowa*, and addressed to men supposed to be at Portage Bay. I found Portage Bay uninhabited, likewise the Twenty-Mile River valley, so I turned in the mail, properly indorsed, to the postmaster at Sunrise.

SOME INCIDENTS OF THIS TRIP.

The nature of the country is perhaps best shown by a mention of some incidents, of no consequence otherwise.

In this section of Alaska the mountains are high and their steep sides from timber line down are covered with timber, brush, fallen trees, rocks, and ravines, making travel very annoying. Snow slides are a constant menace in the spring. We heard the crashes and roars of many of them all around us. The canyons between the mountains have glaciers at their heads and inclose swift glacial rivers. Any intervening space is invariably either swamp or dense brush, also annoying to travel. At the start two and one-half days were spent in repeated fordings of the swift and icy waters of Cabin Creek, surveying a proposed military reservation and carrying rations, sleds, and other impedimenta, including dogs, along the route. Three climbs were made to the top of the mountains, one on reconnoissance and two carrying packs. On the first trip up the mountains, a crust on the snow, with the shoes worn at the time, made a footing difficult and precarious, and the ascent was accomplished only by the aid of alpenstocks. The second and third climbs, by reason of a thaw occurring in the meantime, involved floundering through soft snow to the knees and waist, which not only added to the fatigue of carrying packs, but became uncomfortably damp and cold. On the second climb we packed up rations and cached them in the snow on the summit. The next day we packed up bedding, etc., then uniting both rations and bedding, etc., we proceeded, sliding, floundering, and falling down the other side of the mountain, each man staggering under a 60 to 90 pound pack on his back, including frying pan, coffeepot, bucket, ax, gun, etc. Fresh tracks of a large bear, that had ascended the mountain just ahead of us on the second trip, caused some apprehension for our sack of bacon left on the mountain overnight; but fortune proved to be all right, from our point of view. In descents on these trips we often enjoyed very rapid coasting by simply sitting and sliding down the steep slopes. Rocks, sometimes projecting through the snow, are avoided, when stopping is impossible, by rolling over. On one ascent of this mountain we started from the valley in the rain, passed as we climbed from rain to snow, up through a snowstorm into and through the clouds, and up above the clouds to the summit.

Progress in the canyons and valleys was slow, due to many fordings and wriggling through the almost impenetrable brush, or wallowing through swamps, sinking from 1 to 3 feet in mud and water to the frozen ground below. Lake Glenn, covered with rotten ice in the middle but open at the ends, was crossed on the ice, getting ashore on a floating cake, which broke up and floated out and down Twenty-Mile River just as the last man jumped off it to the shore. The Twenty-Mile Glacier, in receding, has left enormous terminal moraines, some curiously piled in pyramids and resembling preparations for a monster street contract.

The signs of two Indian camps were found near the west end of Lake Glenn. One of them was only a few days old and had been used by a solitary hunter for a night's camp, the remains of an eagle showing his bill of fare.

The lower Twenty-Mile River was feasible for rafting. The means at hand permitted only two very meager rafts, each of three water-soaked logs that rolled and worked like hatracks, and barely sufficient to float two men each. With these a helpless and involuntary sort of navigation snatched us swiftly down to Turnagain Arm and forcibly mixed us up with all the rapids, snags, log jams, and sloughs en route. The impact of one of these collisions threw Abele into the river and he finished the day wet, and blue with cold and hatless. We ran a boiling rapids without accident, and managed, by vigorous paddling, to avoid all sloughs but one. Still this method of travel seemed relatively like the comfort and dispatch of a Pullman car.

We had started around the head of Turnagain Arm on foot, with the intention of rafting across the Portage Glacier River, then packing down the mountain sides and mud flats to Sunrise, when we ran across Mr. Munger and two of his partners, with two small boats. They had been hunting and were returning to Sunrise. They generously took us with them. At Sunrise I obtained rations, and through Mr. Hansen a seal boat, in which, with Mr. Hansen, we made Fire Island, Cook Inlet, on the fourth day from Sunrise, having been storm-bound two days on the way. Hansen is an expert sailor and knows the equation of these waters, and Jenkins is also a sailor, which was most fortunate for us soldiers.

Turnagain Arm belongs in a class with the Bay of Fundy, as a dangerous body of water. Twice each day a tide bore—a 5 to 10 foot wall of water—rolls and tumbles into the arm faster than a horse gallops. When the tide goes out, with similar speed, it leaves exposed great expanses of mud flats, some of them far from shore. On these a boat is suddenly stranded and helpless until the tide comes in, when it may be struck by the bore or held down by the suction of the mud and swamped. The tides are followed by tide-rips and whirlpools. There are many hidden rocks near the surface, among which the water rushes and boils with great fury. The arm is not navigable at all in winter on account of floating ice. Many Beluga (white) whales were seen near Fire Island.

The route between Resurrection Bay and Sunrise, reported on by Captain Glenn and Lieutenant Learnard in 1898, has been improved by the miners since that time. The winter mail for the Turnagain Arm settlements comes in over this trail.

Traders of Sunrise had in use a pack train of nineteen horses supplying miners along the trail. There were three stores, a hotel, and a town hall in Sunrise, and the town appeared thriving and prosperous.

I was informed that the usual Alaska vegetables had been raised very successfully at Sunrise, viz, cabbage, lettuce, potatoes, radishes, onions, pease, lima beans, etc. There were miners at work on all the creeks near Sunrise, and some on the creeks across the arm, viz, Raven, Crow, Glacier, Winner, Yukla, and Indian creeks.

This expedition, though brief, required much fatiguing and uncomfortable work, and in some instances involved considerable personal risk, but the men of the detachment were surprisingly indifferent to both hardship and danger. Acting Hospital Steward Abele and Private Fels both proved to be most excellent men and soldiers in every respect. Mr. Morey worked indefatigably through snow and rain, making surveys under most trying conditions, as well as assisting in packing heavy loads along the trail. Comprehensive maps of these regions are the result of his labors. Packer Canwell, an ex-soldier, did very creditable work. Mr. Jenkins had volunteered to go on this trip from his love of the sport and proved to be a valuable addition to the party. I commend all most highly. We were warmly welcomed at Sunrise, and are indebted to Mr. Brooks, Mr. Preston, and others for many courtesies.

May 31, 1899, to June 8, 1899.—After the Portage Bay trip, and for nine days, I assisted Captain Glenn at the base camp at Tyoonok, began preparations for the trip to the Yukon, and attended to the following instructions:

TYOONOK, ALASKA, *June 4, 1899.*

Lieut. J. S. HERRON,
Tyoonok, Alaska.

SIR: You will proceed this date, on board of the S. S. *Duchesnay*, to Knik Station (Camp Glenn). Upon arrival there you will see that all of the freight is unloaded and will bring back with you all of the bacon now at that place pertaining to the supplies sent up last year. This bacon is to be brought to this camp to be opened and aired for its preservation. You will also bring back with you the mare called "Queen," and see that she is delivered to this camp safely if practicable.

You will also bring back with you Private Sam L. Jones, Fourteenth U. S. Infantry, and Private G. W. Van Schoonhoven, of the Hospital Corps.

You will also examine the hard bread now in the stores at that place to ascertain if it is spoiled, and if so make a memorandum of all that should be issued or given away to the Indians at that place and dropped from my returns.

There is also on hand there a number of rubber boots, underclothing, shoe packs, and other articles of special issue that, if your time permits, I desire you to examine with a view to their destruction after condemnation by you.

Very respectfully,

EDWIN F. GLENN,
Captain, Twenty-fifth Infantry,
Commanding Expedition.

I desire to state in this connection that in rationing my detachments and in loading the steamer at Seattle, under Captain Glenn's directions, I found Commissary Sergeant Turner's efficient services and systematic methods of great assistance.

EXPLORATIONS FOR AN ALL-AMERICAN ROUTE TO THE YUKON FROM TYOONOK, ON COOK INLET, PACIFIC OCEAN, TO FORT GIBBON, ON THE YUKON, ALASKA, JUNE 9, 1899, TO DECEMBER 11, 1899.

The following men were detailed to form my detachment for the explorations to the Yukon (photograph No. 1):

Photograph No. 1.—Members of the Expedition, Suchitna Station.

Acting Asst. Surg. Henry R. Carter, United States Army.

Private Sam L. Jones, Company D, Fourteenth Infantry.

Private Gilbert Dillinger, Company E, Fourteenth Infantry.

Packer E. M. Webster.

Packer George Brown.

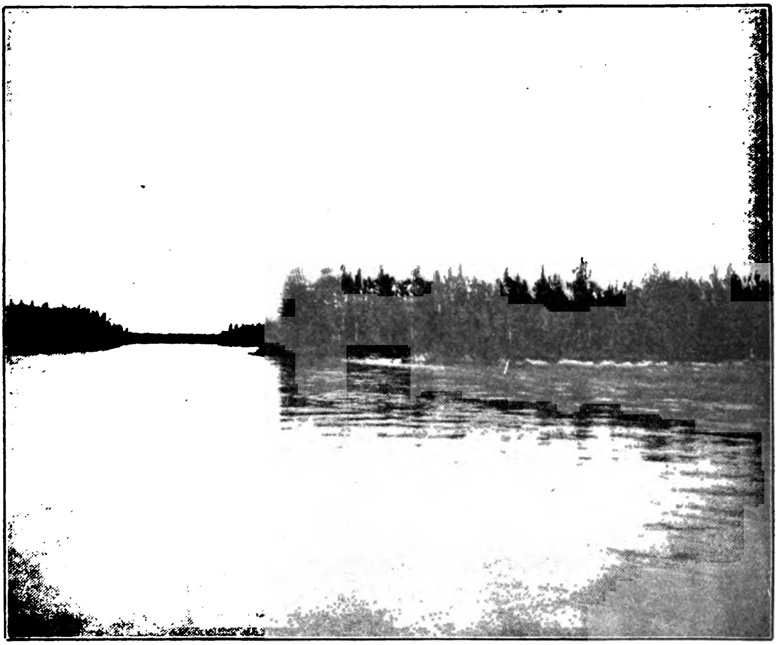
With this detachment, fifteen pack horses, rations to October 31, and equipment for the trip to the Yukon, I was transported, June 9, to Suchitna Station (photograph No. 2), near the mouth of the Suchitna River, with oral instructions to remain there until further orders; meanwhile to hire Indian guides and get information.

My territory for these explorations was to be generally the Yentna and upper Kuskokwim River countries, with the junction of the Yukon and Tanana rivers as my destination.

Through the courtesy of Mr. Cleghorn. the agent of the Alaska Commercial Company at Suchitna Station, a council of Indians was convened to discuss the country into which I was to go. Mr. Cleghorn and I first instructed them as to what was wanted and explained the nature of the horse. The Indians knew very little about the country beyond the divide, by reason of their territory and hunting, trapping, and fishing grounds being restricted, by the oldest traditions and customs among the tribes, to the country east of the divide, with certain limits, for the same reasons, in the other directions. However, on the subject of their own country, they promptly rejected the proposition to seek a pass over the divide via the Yentna River, stating most positively that the Yentna heads in glaciers and that there is no way to get around them.

Photograph No. 2.—Old Suchitna Station.

After taxing their patience to the limit in combating the latter statement, I investigated the subject of a branch of the Yentna, the valley of which would answer the purpose. To this they acquiesced. It developed that only two of these Indians knew the head waters of the only branch which would fulfill the requirements. I satisfied myself that we understood each other, and, after some more parleys, I hired as guides two of them, Stepan and Slinkta, who were recommended by Mr. Cleghorn. They agreed to point out the branch river decided upon (the Keechatno), and to accompany me to my destination on the Yukon.



Photograph No. 3.—Yentna River.

June 27 to 30, 1899, the party, including the Indian guides Stepan and Slinkta, proceeded by the steamboat *Duchesnay* up the Suchitna to the Yentna River (photograph No. 3), up the Yentna, guided by the Indians, to the Keechatno River, and up the Keechatno about 3 miles, where my men, horses, and impedimenta were landed on the north bank (photograph No. 4). June 29 I accompanied Captain Glenn, on the boat, to the head of navigation of the Yentna, in the capacity of engineer officer, returning June 30 to my camp on the Keechatno. Here I landed and took charge of my own expedition. Captain Glenn and the steamboat pulled out down stream June 30 and went back to the Suchitna River.

The Yentna River possesses a well-defined channel and is very favorable to navigating river steamboats as far as the Keechatno. I estimated the rate of the current to be about 4 or 5 miles an hour. The width averages about 100 to 200 yards. There are many small islands and sloughs, but not so numerous as to constitute what are called "flats." The topography of the Yentna country is shown on the map accompanying.

Photograph No. 4.—First Camp on Keechatno River.

THE OVERLAND TRIP TO THE YUKON, JULY 1, 1899, TO DECEMBER 11, 1899.

The following were my orders, received June 28, 1899:

ORDERS, No. 3. } KEECHATNO RIVER NEAR YENTNA RIVER, ALASKA,
June 28, 1899.

A detachment consisting of First Lieut. J. S. Herron, United States Army, commanding, Acting Asst. Surg. H. R. Carter, two enlisted men, two packers, and two Indians will proceed from this point to-morrow, the 29th instant, or as soon thereafter as practicable, to the junction of the Tanana and Yukon Rivers, and from that point to Rampart City, Alaska. Should this detachment reach the last-named place early enough in the present season to warrant its doing so, it will proceed to the city of Peavy, on the Koyukuk River.

The route to be traveled by this detachment will be by the best available for public travel. From present information this route should be across the divide near the head of this river to the head waters of the Kuskokwim River, thence in a northeasterly direction to the mouth of the Tanana River.

The object of this expedition is to explore the country between Cook Inlet and Rampart City for the most practicable trail connecting the points named, and as much time as circumstances will admit of will be devoted to selecting the route that is the most practicable.

Upon completion of this duty this detachment will proceed to Seattle, Wash., reporting to the commanding officer of Cook Inlet Exploring Expedition en route to that place at the permanent camp now located at Tyoonok, Alaska. Reporting at the last-named place can be omitted in case the season is too far advanced or in case it is found to be impracticable to obtain the necessary transportation to that point.

Rations for the period ending October 31, 1899, will be carried on the fifteen pack animals landed at this camp this date.

The travel herein directed is necessary for the public service.

EDWIN F. GLENN,
Captain, Twenty-fifth Infantry,
Commanding Cook Inlet Exploring Expedition.

KEECHATNO RIVER, ALASKA, *June 28, 1899.*

First Lieut. J. S. HERRON, U. S. A.,
Keechatno River, Alaska.

SIR: You will take charge of the detachment as per Orders, No. 3, herewith inclosed.

For your information and guidance, I beg to inform you that your first objective is Rampart City, and if possible to find a trail to that place you will bend all of your energies to the accomplishment of the same. The extension of your work to the city of Peavy is not absolutely essential unless and until you have first found the trail to Rampart City, and even should you accomplish the work thus assigned you, it is not desired or contemplated that you will take any unusual or unnecessary risk in taking your detachment farther than Rampart City. The country over which you are ordered to proceed is so little known that it is impracticable to give you anything like definite instructions as to the route to be pursued, so that you will be forced to depend upon the information you may be able to obtain from your Indians and such other natives as you may chance to meet en route.

Upon arrival at Rampart City, I will thank you to advise me both at Circle City and also at Seattle, Wash., of the date of your arrival and such other information as to the condition of your command and future movements as you may be able to communicate.

It is desired that you manage to come out of the Territory during the open or summer season if practicable, but should you be unable to accomplish this you will wait until such time as it may be safe to come out overland and proceed to Seattle, Wash., as hereinabove directed.

Your detachment will cover as much territory as practicable in the section of country named. Your territory will be bound on the east by the Suchitna River and on the north and west by the Tanana, Yukon, and Koyukuk rivers, and you will collect all information that may be available and that may prove of value to the development of the country explored, regarding, first, topographical features; second, available routes of travel; third, feasible routes for railroad construction; fourth, appropriate and available sites for military posts; fifth, adaptability for agriculture and stock raising; sixth, mineral resources; seventh, timber and fuel; eighth, food products; ninth, the stock best suited for transportation purposes; tenth, the number, location, and condition of the natives in the territory explored.

I will thank you to make reports of progress made upon every available opportunity, and upon completion of the duty assigned you a complete report of the work performed by your detachment. This latter report will be accompanied with maps and photographs illustrating the nature of the country traversed.

The employment of such Indians, natives of the country passed over, as may be necessary, is hereby authorized.

In addition to the rations mentioned in your order your detachment will be supplied with the necessary instruments and material for surveying, photographing, collecting specimens of minerals, plants, etc., as hereinabove contemplated and directed.

It is hoped and believed that you will take every precaution for the proper and thorough protection of the members of your command, who are expected to return to Seattle with you except the two Indians, who are to be returned to Cook Inlet either from the mouth of the Tanana River or via St. Michael, Alaska, as circumstances that confront you may seem to indicate to be best. When discharged they will be given an order upon the agent of the Alaska Commercial Company either at Tyoonok or Suchitna Station stating the number of days they have been employed and the amount due to each for services rendered. I will thank you to notify me at Tyoonok of the amount due to each as stated in the order given to the agent as above directed.

On account of the nature of the country from this point to the Suchitna Station it is not deemed advisable for you to return to that point overland or by the trail followed by you on the advance unless you should fail to get through to Rampart City, in which case you are authorized to return to this point or some place on the Yentna River, from which place you can send a courier by water notifying the captain of the *Duchesnay* of your location so that he may call for you, assuming that the water in the last-named river will permit of the steamer coming up to you.

In order to return to Seattle, Wash., as herein contemplated, it will be necessary for you to apply to the commanding officers at Rampart City and St. Michael for the necessary transportation.

Very respectfully, your obedient servant,

EDWIN F. GLENN,
Captain, Twenty-fifth Infantry,
Commanding Expedition.

I also received oral instructions in about the following words: "The Assistant Secretary of War directs attention to the fact that no information or map of the country explored should be given out in advance of its publication by the War Department."

I was also handed a letter from one J. Dietrick, and other papers, on the subject of the Koyukuk country, addressed to the War Department, referred to Captain Glenn for investigation and by him referred to me. These papers claimed that the Koyukuk Indians were dangerous, and the Koyukuk was also threatened by bad white men; that the Koyukuk contained a large population and interests, and that the Koyukuk needed a military post and soldiers to protect the people from the Indians and bad white men. I took these papers with me on the trip and refer to them later.

The following was my outfit, a useful one to put on record, for overland summer travel in the interior of Alaska, for a party of eight men for four months:

Fifteen pack horses (Oregon range horses, not shod).

Fifteen pack saddles, double saddle blankets, mantas, lash and sling ropes, halters, horse brush, lace, bridle and latigo leather, horse medicines, cow bell and neck strap, extra cinch rings, etc., one pair canvas paniers, for kitchen horse; one canvas needle (large), and twine for sewing sacks.

The only horse medicines needed were kerosene oil and bacon grease, castile soap, cosmoline and carbolic acid, and alcohol.

Canvas and corduroy trousers, canvas coats, flannel shirts, heavy sweaters, needles and thread, extra underclothing and shoes, pipes, pocket knives, soap, towels, toilet paper, etc.

"Porpoise" shoes (extra laces).

Seven axes, and six files for sharpening them; six extra helves.

Three rifles.

One shotgun.

Head nets and gloves to keep off mosquitoes (photograph No. 5, page 26).

Army shelter tents, canvas sewed on the bottom, front, and back; four shelter halves to a tent, and all seams sewed, except the slit opening in front, which is provided with a flap, upon which the blankets overlap; a triangular piece of netting is sewed in the top for ventilation. A rope runs through the top and is stretched over forked sticks and pegged down (photograph No. 6, page 26).

Three frying pans.

Four granite-ware buckets.

One coffeepot and coffee mill.

One teapot.

Butcher knife, long-handled fork, long-handled spoon.

Bread pan.

Preston mess kits, aluminum; the canteens were used for match boxes. (There is no trouble in getting water in Alaska.)

One pick, two shovels.

One folding canvas canoe.

One hatchet.

Six hundred pounds breakfast bacon, in canvas sacks holding about 50 pounds each.

One thousand pounds flour, in paraffined canvas sacks holding 50 pounds each.

Forty pounds baking powder.

Two hundred pounds rice, in paraffined canvas sacks holding 50 pounds each.

Fifty pounds peas, in paraffined canvas sacks.

One hundred pounds evaporated apples, in paraffined canvas sacks.

Fifty pounds evaporated apricots, in paraffined canvas sack.

Fifty pounds evaporated potatoes, in paraffined canvas sacks.

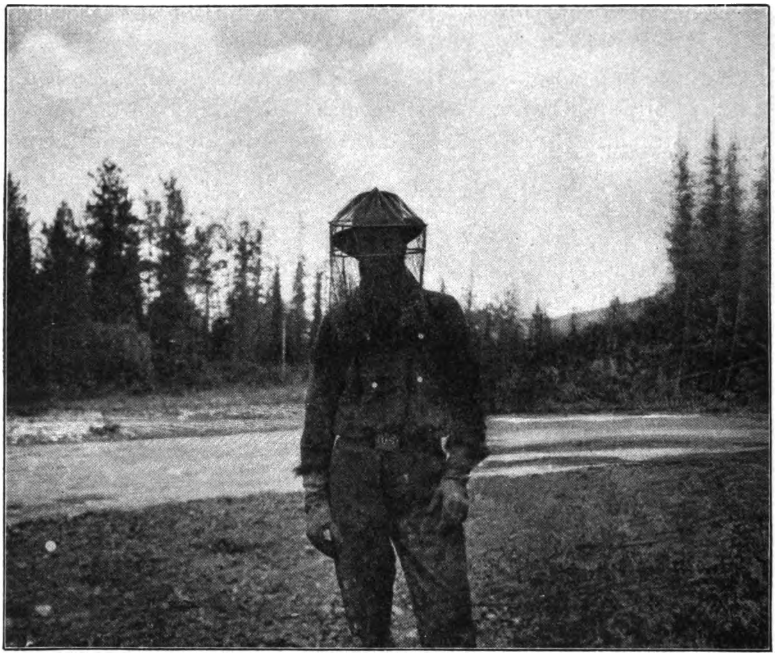
Fifty pounds evaporated onions, in paraffined canvas sacks.

Fifty pounds prunes.

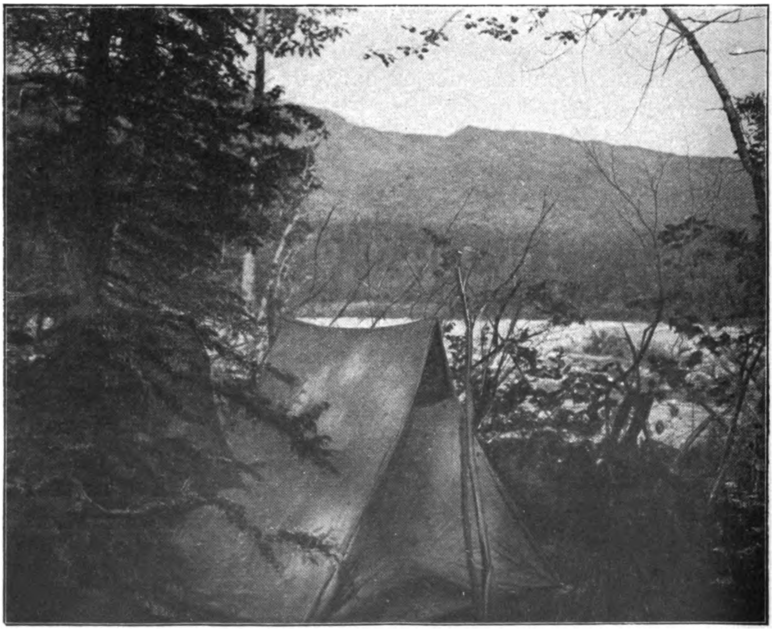
Seventy-five pounds coffee (roasted), in paraffined canvas sacks.

Twenty pounds tea, in triple sacks of paraffined canvas.

Two hundred pounds loaf sugar, in paraffined canvas sacks holding 50 pounds each.



Photograph No. 5.—Head Net and Gloves, Necessary in Summer for Protection from Mosquitoes.



Photograph No. 6.—Small Mosquito-proof Shelter Tent Used in Summer.

Fifty pounds salt, in paraffined canvas sack.

Fifty pounds rock salt (for the horses), in paraffined canvas sack.

Twenty pounds soap.

One pound pepper.

Five pounds matches in canteens, in paraffined canvas sacks, in bottles, and cans.

Fifty pounds compressed pea-meal soup, in paraffined canvas sack.

One pound malted milk.

Two pounds kola nuts, kola beans, grape nuts.

One pound citric acid.

Fifty pounds hominy, in paraffined canvas sack.

Forty pounds plug tobacco, in paraffined canvas sack.

Twenty pounds smoking tobacco, in paraffined canvas sacks.

Forty pounds medicines, bandages, and instruments, surgical and dental, in paraffined canvas sacks, including 1 quart brandy and 1½ quarts whisky.

Seventy-five pounds rope.

Fifty pounds rifle and shotgun ammunition.

Note books, camera, plates, films, etc., prismatic and box compasses, barometer and psychrometer, chronometer, field glasses, Agricultural Department press for specimens.

Making about 3,300 pounds, or an average of about 220 pounds to a horse.

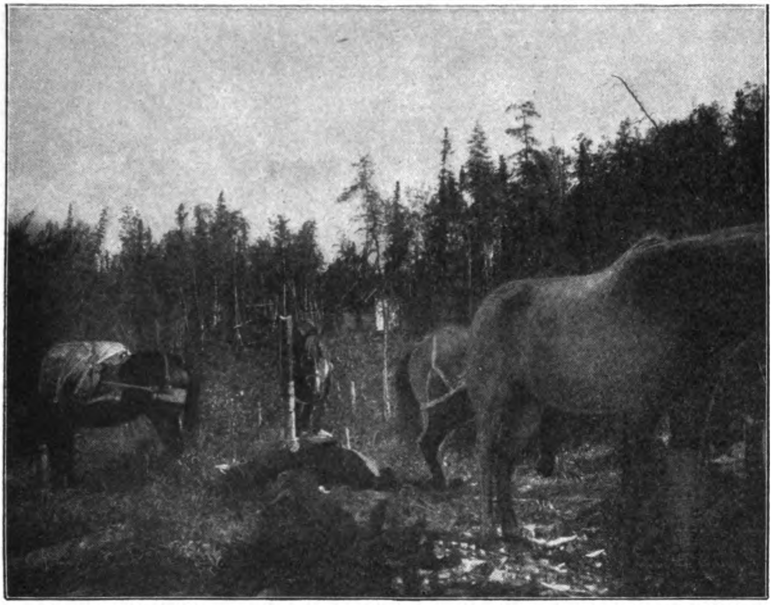
NARRATIVE.

Shortly after noon, June 30, the steamboat left us, six white and two red men, camped in a fringe of alder and spruce timber on the north bank of the Keechatno River. The fifteen pack horses, tied on a picket line, were fed their last ration of oats and over 3,000 pounds of our rations and other impedimenta were piled up on the ground. The country, as will be seen, being wild and overgrown, exacted from us extraordinary labor at every step, and from this time on until winter the daily routine was as follows: A reconnoissance for the best route for the day's march; a search for fords, crossings, detours around or passages through ravines, swamps, and other obstacles; the construction of a pack train trail by chopping out timber and brush in dense forests, blazing in open forests and corduroying in soft mud and tundras; fording or swimming the pack train over the rivers encountered and the building of spar bridges for the horses, where mud-bottom creeks interposed, which were too shallow to swim, yet too deep to corduroy, too soft-bottomed to ford, and too wide to jump; investigation for wood, water, grass, and, if possible, a breezy locality for camp, wind, as an additional requisite, minimizing the mosquitoes, gnats, horseflies, and mooseflies; packing the horses in the morning (photographs Nos. 7 and 8); driving, racing, dragging, or otherwise hustling them into and along the trail, and adjusting or repacking shifted packs during the day, and unpacking, washing backs and oiling ears, eyes, and other favorite mosquito resorts at night. Before packing each morning the herd had to be rounded up, driven to camp and caught up, and previous to the round-up it had to be found—a difficult task after its night's wanderings in search of feed and relief from mosquitoes, notwithstanding the conservative disposition of the bell horse "Shorty." Besides energetically nodding his intelligent head and making the most of the cow bell strapped around his neck, "Shorty's" strong point, as the bell horse and leader of the herd, was that he was no leader at all, but the best kind of a follower. Though "Coley," "Bitter Root," "Minnie," and other restless spirits led the herd on long excursions away from camp, "Shorty" was always present in rear of the bunch, where his filibustering tactics saved many miles of pursuit for us. Nevertheless, the daily round-up involved much tedious trailing through the forests on a track often crossed and recrossed by the herd many times and scouring the country for miles around.

In addition to the above daily duties, a military reconnoissance survey of the country passed over was made. Specimens of plants were collected; photographs were taken and carried through under many adverse circumstances. Making and breaking camp and cooking meals were details. Sharpening the axes for the day's trail cutting was necessary each morning and drying wet clothes and blankets each night.

The winter routine differed from this, and will be described later.

I started overland July 1, and a forced march that day netted 3 miles along the trail, 2 miles air line, westward, and nothing northward, in which latter direction the destination lay. The first objective was to get through the Alaskan



Photograph No. 7.—The Pack Train, near the Chedotlothno Indian Village.

Photograph No. 8.—The Pack Train, near the Mouth of the Echeatnu.

Range, a mass of enormous peaks and glaciers about 70 miles wide extending across Alaska and constituting the chief barrier to the interior. I consumed the month of July exploring through these mountains. The first day's march was through dense timber and over soft ground. The packs were heavy, the lash ropes stiff, and the horses frolicsome. The transportation stampeded back on the trail at every opportunity, raced through the woods, knocked off packs, plunged into mud holes, bogged down, and it required eleven hours of patient toil to make that short march. Upon making camp the trail was blocked by felling trees across it, the herd turned out, and for this night only the more restless ones were hobbled. The second day, Sunday, July 2, 3 miles were made over firm ground covered with patches of willow brush. This brought us to a small foothill about 40 feet high, and called by my Indians "Pol-tish-ee." Camp was made in a large grass meadow and the trail blocked.

The next day a trail was cut and blazed along the ridge, leaving the river and striking it again at a point 3 miles farther on. An old camp and blazes showed where the Indian Ivan had been on a hunting expedition.

July 4, 3 miles of trail were cut and the train driven over the 6 miles with only a single mishap. July 5, 3½ miles were made, over firm ground, crossing the Nakochnu River, which marks the point where the Indians cache their canoes, or the head of Indian canoe navigation. This day's march brought us to the foot of a second ridge about 100 feet high, called by my Indians "Nin." A corresponding ridge on the opposite side of the river they called "Tesch."

The Nin ridge (photographs Nos. 9 and 10) is well timbered and watered with small streams, and contains thousands of acres of natural grass meadows. Five days of good progress were made along this ridge.

July 10, the Indians informed me that it would be impossible to get the horses over the divide, that it consisted of vertical rock cliffs, and that the Indians who crossed had to use their hands in climbing over. I told them we should make efforts to get over. July 10, one of the horses fell, knocked over Webster, and both rolled down a steep bluff together, but luckily escaped serious injury.

Photograph No. 9.—Natural-grass Meadow, Nin Hill, Keechatno River. This grass was nearly six feet high. The herd can be seen near the center of picture.

Photograph No. 10.—Looking North from Crest of Nin Hill, Keechatno River.

During the following six days the Indians informed me that they "saveyed" (knew) the country no further. I proposed climbing to the top of the mountains (photograph No. 11) for a reconnoissance, and devoted the afternoon of the 16th to doing so. The Indians still wanted to go back, repeatedly warned me "one month snow," and made efforts, each day, to persuade me to abandon the trip.

July 17, I went into camp after a short day's march to make a fire and warm up Carter, who, in fording the Keechatno River, was knocked down, carried off, and pounded on the rocks by the swift current. The Indian Stepan rescued him from a disagreeable situation. We were nearing the head waters of the Keechatno (photograph No. 12), when, on the 19th, the monotony was relieved by the discovery of the pass over the divide (photograph No. 13, page 34). The formation, locality, and game trails of antiquity all indicated that I had found the pass I sought. I asked my Indians for their opinion, but I received a reply of "No savey." I camped in the last clump of trees, our elevation now being at the timber line, and prepared to reconnoiter the pass.

Stepan shot, about a mile from this camp, a large bull moose. The animal was not far from 20 hands high and very fat, the antlers in velvet state. The fresh meat was welcome after a diet of bacon. The Indians consider the soft outer edge of the horns a great delicacy, likewise the nose, the sole of the hoof, the intestines, and the marrow of the bones.

Leaving three men and the horses at camp, I took the Indians and Dillinger and Brown, with a pick and two shovels, and explored the pass for nearly 10 miles, found it wide throughout, of slight grade, safe from snow slides, free from glaciers, the elevation on the crest taken with barometer and psychrometer 3,600 feet above sea level, and practicable for trails, roads or railroads. There was no need for the pick or shovels.

While in this pass I came upon two enormous brown bears, asleep (sometimes called the glacier bear, or the grizzly). Led by the Indian Slinkta, I crawled around to the leeward and then approached them, too near, I thought to myself, as I had a poor gun, only a few cartridges, and the nearest tree was 5 miles away. Slinkta whistled and awoke the bears,

Photograph No. 11.—View from Top of To-toy-lon Mountains.

Photograph No. 12.—Headwaters of the Keechatno.

while I fired and shot the larger one in the head, but only staggered him. He arose and passed a swinging right-hander at the other bear, but missed him. They got away.

The same day Jones and Webster were chased by a brown bear, near the glacier at the head of the Keechatno. Four or five shots in the bear turned him but did not kill him. He took to the brush.

Photograph No. 13.—East Entrance to Simpson Pass.

The 22d of July I crossed the crest of the divide and started down the other side of the watershed. East of the divide the drainage is into the Pacific Ocean; west of it into Bering Sea.

Bering Sea is closed by ice in winter, while the Pacific Ocean is open. Hence routes into the interior must connect with the latter.

In the vicinity of camp, July 23, on the Tateno, were hundreds of mountain sheep, high up near the summits. Jones, Carter, and Slinkta climbed the mountains and shot two. An enormous moose trotted by this camp, but we were already loaded down with meat and let him go. The mouth of the Tateno and the view up the Echeatnu Valley are shown in photograph No. 14, page 36.

July 26, Carter and I met a black bear and cub; wounded the old one and caught the cub, but we turned the little fellow loose the next day.

July 27, I turned northwestward down the valley of the Echeatnu (photograph No. 15, page 36).

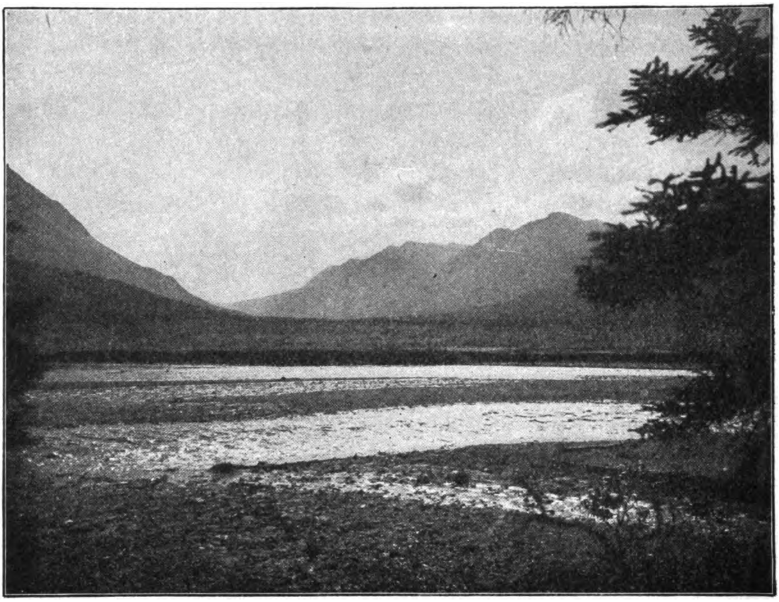
July 28, after having exhausted all their arguments to persuade me to turn back, Slinkta and Stepan, theretofore faithful and energetic, slipped out of camp, deserted, and went back to the coast. There being no other Indians in that section of the country at that time, the loss of my natives was a severe blow to the expedition. It was not unexpected, however. I had previously considered the question of putting a guard over them day and night, but had decided it to be impracticable. This deprivation of the Indians' energy and skill as axmen, hunters, and trailers, and their craft and instinct as woodsmen and reconnoissance men, put more than a twenty-five per cent handicap on the progress of the expedition. I proceeded, all of us redoubling our efforts, did my own guiding, and traveled by compass and the sun.

August 8, I left the Echeatnu Valley (photographs Nos. 16 and 17, page 37) and turned to the northeast. I found two Indian villages, both deserted. The village at the mouth of the Tonzona (photograph No. 18, page 38) was also deserted.

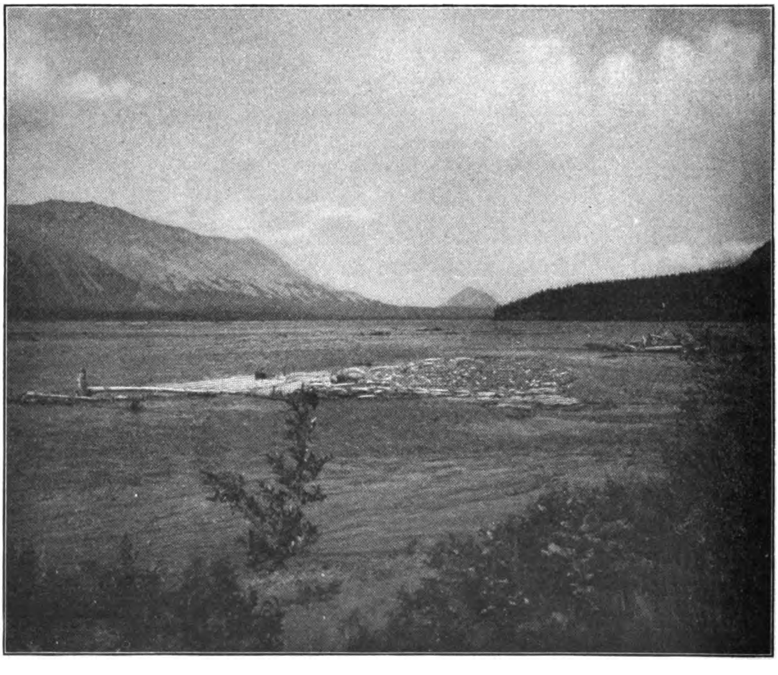
For two weeks in August I was disabled by a sprained ankle, caused by a pack horse jumping and falling on me in a mud hole, but continued the march, riding a pack horse during the interval. August 8 to 18 much soft ground was encountered.

August 13 the horse "Laddy" fell into a deep swamp drain, with vertical walls of frozen gravel, dragging Brown with him and under him. Both had a disagreeable and dangerous experience.

Photographs accompanying show the deserted village at camp, August 18, on the Chedotlothno. It consisted of two cabins of hewn logs (photographs Nos. 19 and 20, page 39), a cache (photograph No. 21, page 40), and a graveyard. In one cabin was a sled, a pair of snowshoes, a stove, a knife, spearhead, and some pictures of Russian divinities and prophets.



Photograph No. 14.—Looking South up the Echeatnu Valley from Mouth of Tateno.



Photograph No. 15.—Looking North down the Echeatnu from opposite the Terra-cotta Mountains.

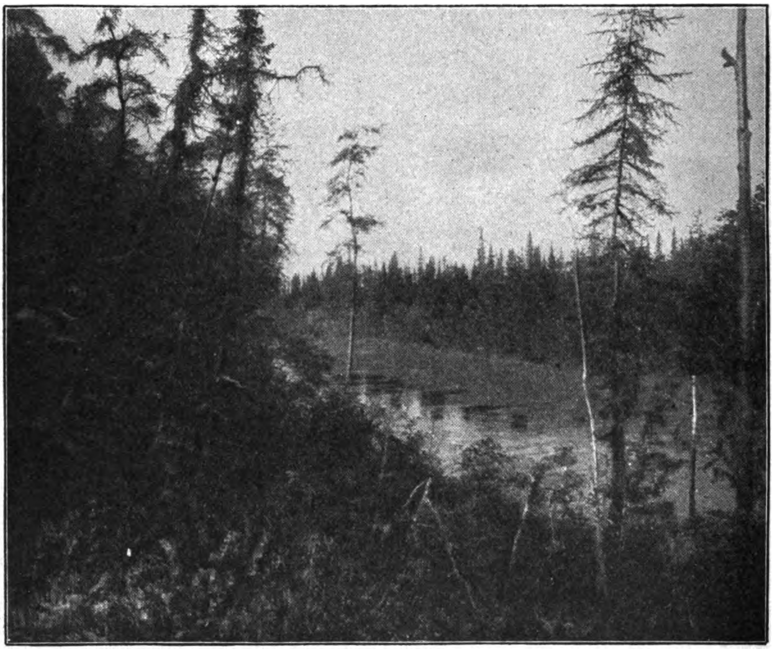
Photograph No. 16.—Looking West across the Echeatnu near its Mouth.

Photograph No. 17.—Looking North down the Echeatnu near Mouth.

Small ridges lying between the Chedotlothno and the Kuskokwim are shown in photograph No. 22, page 40.

August 25, I lost two pack horses by their having been snagged, one in the abdomen and one in a lung. I was obliged to abandon the canvas canoe here on that account.

August 25 to September 1 brought us to higher and firmer ground.



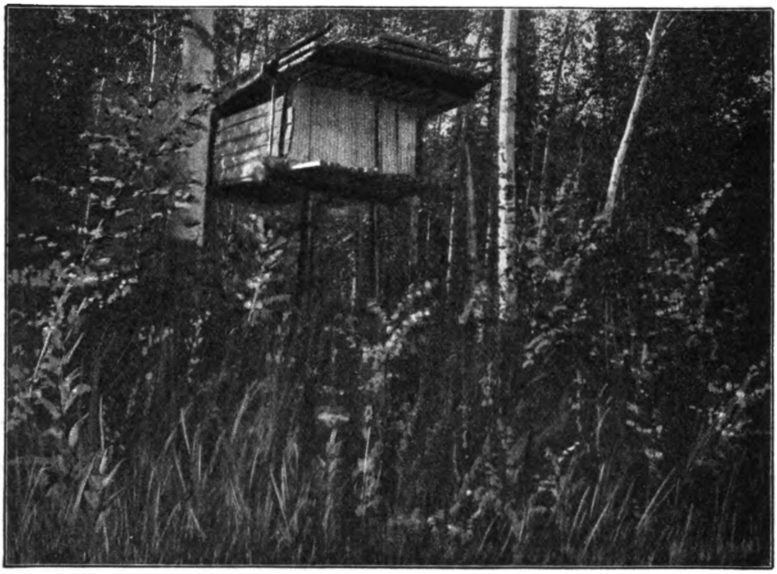
Photograph No. 18.—Tonzona River.

About September 1 frosts at night killed off the mosquitoes; also the grass and leaves. September 3 I began feeding the horses flour. A violent earthquake occurred at 2 p. m. on the 3d. A sack of evaporated potatoes was punctured and leaked out on the trail about this time, which ended our potato diet.

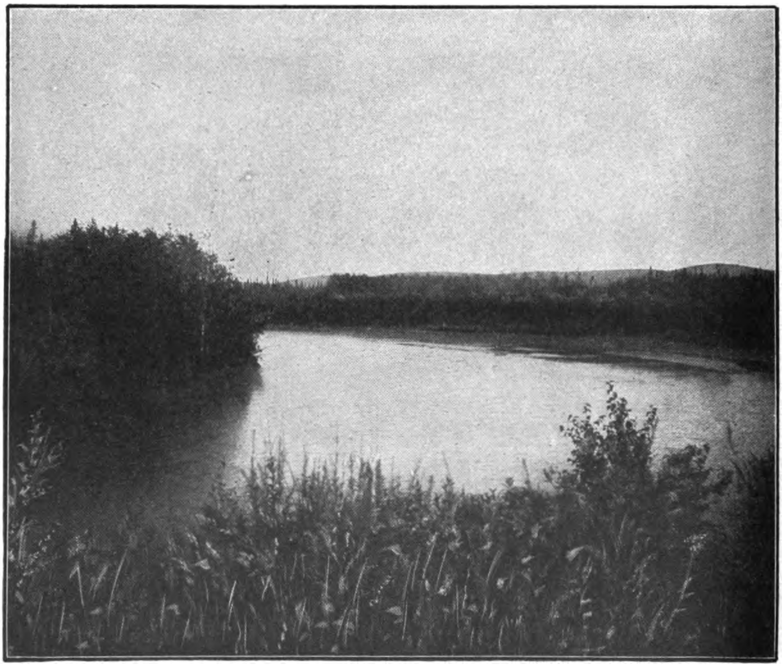
September 4, I cached some bacon, rice, matches, and other supplies, crossed a swampy region, and reached the Tatlathno and high ground. While I was exploring beyond this point a bear knocked down my cache and ate 50 pounds of bacon. An Indian crossed his trail, tracked him to his hole, killed

Photograph No. 19.—House at Deserted Indian Village on Chedotlothno.

Photograph No. 20.—House at Deserted Indian Village on Chedotlothno.



Photograph No. 21.—Cache at Indian Village on Chedotlothno.



Photograph No. 22.—Ridges between Chedotlothno and Kuskokwim.

him, found that he had been indulging in bacon, and started out to find the white men. We owe much to that bear, and as we helped to eat him we were not out much by the loss of the bacon.

I was exploring down a good-sized river that I had encountered, when hunger put an end to my pack train. In spite of precautions the horses had broken down ropes, pawed open packs at night, and had eaten 45 pounds of compressed soup and the last of my sugar. They gathered around us when we ate our meals, and we often divided our small ration of bread, and even bacon, with them.

Rations were getting so low that I could afford no more flour for them, so finding, at camp September 8, abundant, though withered and leafless, willow brush and good shelter, I cached the pack saddles and horse equipments, turned out the horses, and started to explore down the river on rafts.

The river in this locality is crooked, swift, full of snags and sweepers, and dangerous for rafting. Eight miles down begins a series of log jams extending entirely across the river. Rafting was a succession of collisions and clashes, one raft being actually turned bottom up twice and some of us knocked overboard by snags and sweepers. That trip cost us some more rations, spoiled by wetting, and the coffeepot, bread pan, a bucket, camp hatchet, and a frying pan, which went to the bottom, though they had been lashed on.

We had nearly cut through the first jam when the discovery of others below made rafting there out of the question.

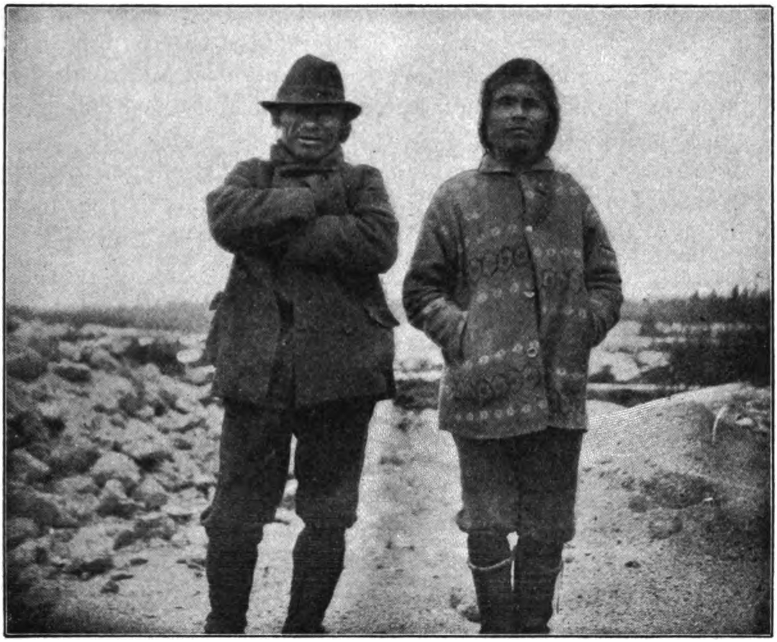
I made another cache at this point. The expedition was now reduced to the last resort, that of becoming its own pack train. We filed along like coolies with fifteen days' food and other impedimenta harnessed on our backs, making packs so large and heavy that progress was a continuous performance of wrestling, the pack having the advantage of a double-Nelson hold and the assistance of the brush and timber. The first damp snowfall loaded the trees until they bent under its weight. Then, as we pushed through the brush, each tree dropped a small avalanche on our heads and kept our clothes wet, while the snow on the ground added to the labor and discomfort of walking and kept our feet wet.

From camp September 14 to camp September 16 I rafted. I was led by fresh blazes on the trees and other signs to believe that there were Indians on this river, and I expected to find them, though I had been nearly two months looking for some. I left a small cache at camp September 16 and started packing back up the river, through the snow. All day September 17 we toiled for 18 miles, all day September 18 for 20 miles, during which Jones fell and sprained his ankle, while mine, sprained in August and not yet healed, was swelling. The outlook was becoming annoying.

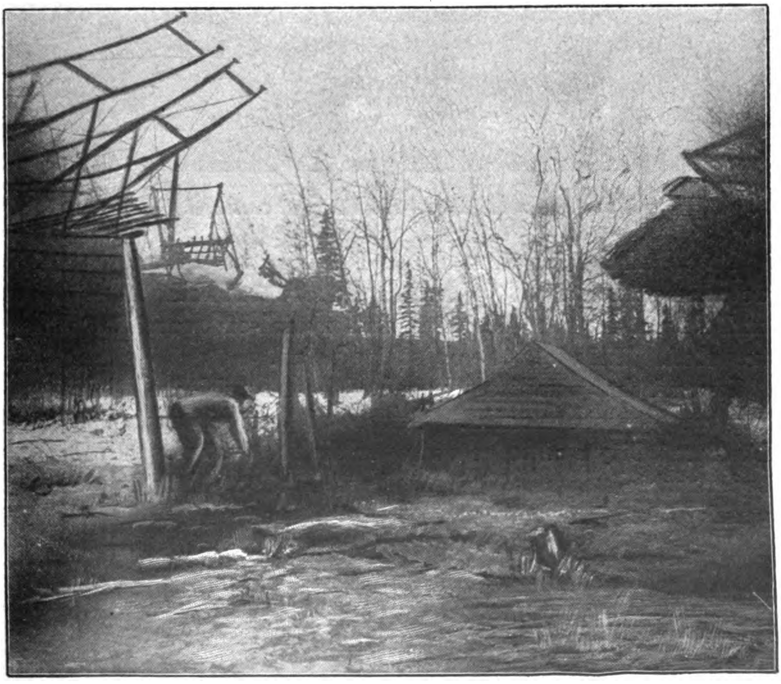
September 19 we found an Indian, who, I learned later, was the one who had killed the bear that had robbed our cache; or rather, the Indian found us. It is needless to say that we gave him a welcome, sincere if not verbose, our mutual vocabulary consisting of three words, "yes," "no," and "good," and the Indian seemed to think them synonymous at times, but the deficiency was made good by pantomime. I learned his name to be Shesoie (photograph No. 23). Eight days were spent in negotiations to hire him for a guide and setting a time to start. On the 27th we packed 25 miles to Shesoie's village, "Telida" (photograph No. 24), and I proceeded to go into camp there for two months, until we could get winter clothes and socks made of our horse blankets, procure mits, fur caps, moccasins, and snowshoes for the party from the Indians, and to wait until conditions were favorable for snowshoe travel. During the stay at this village we hunted and explored in the surrounding country, brought in our caches and moose meat, and, as far as possible, I learned all that the Indians knew. Our food during this period was chiefly moose, bear, beaver, fish, and tea. The Indians were hospitable, but childish, requiring careful management. In our condition we were in their power and we knew it, but they were our prisoners and they did not know it. There was to be no deserting us this time. Before the two months had elapsed, however, I had gained their entire confidence and friendship.

November 25, with four Indians as guides, I resumed the exploration of the last 171 miles on snowshoes, cutting and blazing the trail and mapping the country as before. The transportation consisted of dogs and sleds—9 dogs and 3 sleds.

We bivouacked on the ground, digging through the snow, using our snowshoes as shovels, piling shelters of spruce trees around us, and keeping the fire going all night, as we had few blankets and few clothes.



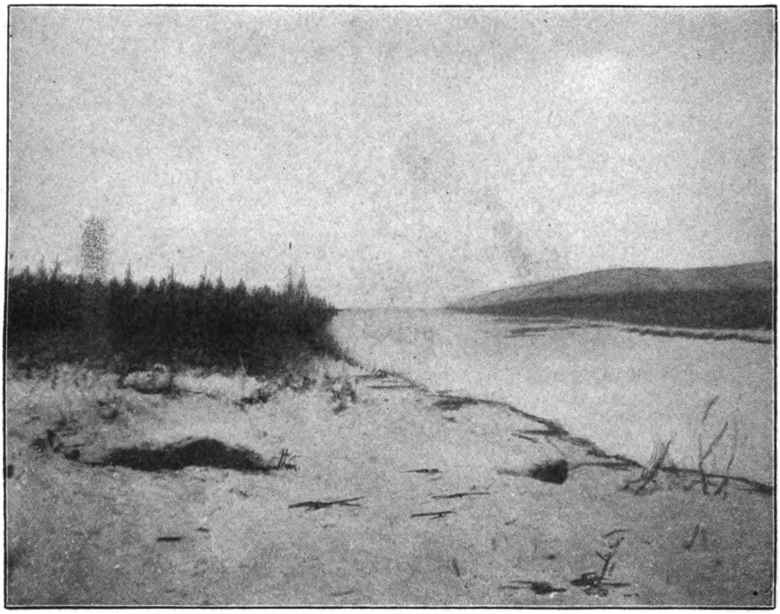
Photograph No. 23.—Shesoie and Minchumina Ivan. Shesoie to the right of the picture.



Photograph No. 24.—Telida.

We ran out of food on the trip, and hunting netted only a few ptarmigan, but, luckily, we intercepted the fresh trail of a party of Tanana Indians, overtook them after a hard all-day chase, and I obtained enough moose meat and dried fish from them to last us through.

I found a band of Indians camped at Coschaget, on the Tanana (photograph No. 25). They courteously invited us to a lunch of bread, butter, and tea—luxuries to us.



Photograph No. 25.—The Tanana at Coschaget.

I reached the junction of the Tanana and Yukon with my detachment about 3.30 p. m., December 11, making five months and eleven days on the trail and a total of over 1,000 miles traveled. This was the objective point.

I found that a military post had been established there during the past six months. I expected to equip and proceed to Rampart City and to go out over the ice, but was stopped by orders which awaited me at Fort Gibbon. My detachment was kept on duty at that post until May 25, 1900.

TOPOGRAPHICAL FEATURES.

The following is a list of the principal topographical features:

Where the physical features of the country bore traditional Indian names, recognized among the tribes, I obtained and adopted them as the designations, spelled phonetically, on my map, which is a part of this report, in conformity with the policy of the War Department. Besides the ethnological value of these names, their practical utility is established.

The Yukon and Tanana Indians, as well as the Kuskokwims, are familiar with the names and features of the Kuskokwim country. The Indians on the lower Yukon pronounce all "ch" sounds hard, like *k*. Min-chu-min-a is pronounced by them *Min-ku-min-a;* Cos-chaget, *Cos-kaget*, and so on.

East of the McKinley Range the names are those of the Suchitna Indians.

RIVERS.

Car-ilt-nu.*
Chat-lak-nuk.*
Che-dot-loth-no.*
Chick-kaw-kay-lent-nu.*
Chit-an-ana.*
Con-tay-thno.*
Cos-na.*
Cut-nu.*
Dillinger.
Earl.
E-cheat-nu.*
Ecol-ena.*
Gil-is-kon-kok.*
Guth-na.*
Hitz-ee-col-och-na.*
Jam-bod-i-nook.*
Jones.
Kee-chat-no.*
Ki-un-ik.*
Morris.
Na-koch-nu.*
Nitz-u-tal-ee-na.*
Shiss-nona.*
Tate-no.*
Tat-lath-no.*
Tel-itz-o-tot-el-no.*
To-ko-loch-nu.*
Ton-zona.*
Tu-lu-shu-lit-na.*

The old Indian name for the Kuskokwim was "Chin-ana," now obsolete except among the old Indians.

The Indian terminations "na," "nu," or "no" mean "river"—Tonzona, Echeatnu, Tanana, Cosna; "Chaget," "Kaget," or "Kakat" mean "mouth of," as Coschaget—mouth of Cosna.

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* The Indian name.

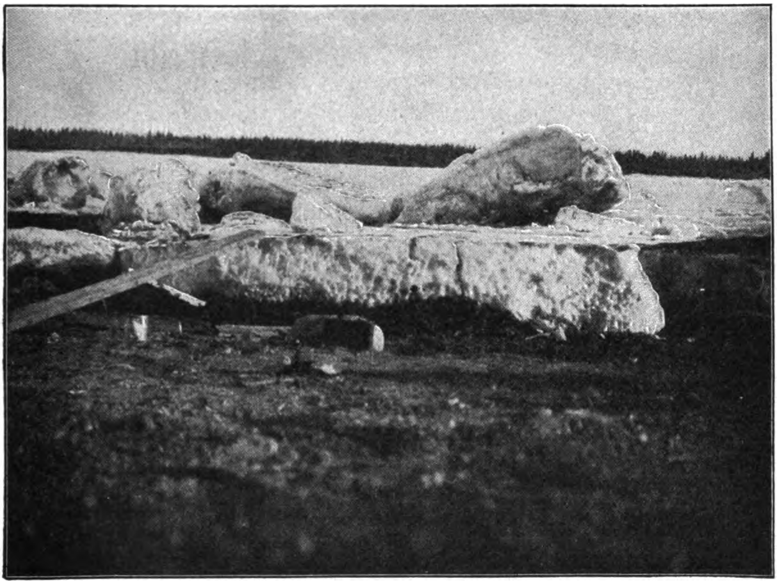
I swam the horses over the following rivers: Jones (about 20 yards wide), Tonzona (about 30 yards wide), Chedotlothno (about 60 yards wide), Telitzototelno (at its mouth about 10 yards wide), and some small ones not named. In some cases I swam the horses across with packs on, and in others I took the packs over in the canvas canoe and swam the horses without packs. All other rivers intersected by the pack-train trail were forded, except some boggy-bottomed creeks, which I bridged. The Tatlathno, at Telida, is about 30 yards wide, the Kuskokwim, where the trail crosses, about 20 yards wide, the Cosna about 15 yards wide.

I judge the Kuskokwim to be navigable for large river steamboats as far as the Echeatnu, and for small steamboats as far as the Tatlathno, and the Chedotlothno as far as the island at camp, August 25. The Tateno was forded by the advanced party, four of us abreast, bracing each other in line parallel to the direction of the current, maintaining our cohesion by gripping each other's axes extended across our bodies like a continuous pole. Each of the men with the pack train kept his footing in fording by holding to a horse. In fording streams by this latter method, which was used in rivers too swift for a man to cross alone, we held the horse's tail with one hand and the lash rope of the pack with the other, keeping on the downstream side of the horse.

In order to send the herd across a stream, our bold water horse, "Roaney," would be started across first and kept going by throwing stones at him; the other horses would then be driven into the river and would follow. Meanwhile, each man would grab a horse and the whole party go over.

The Keechatno, Tateno, Dillinger, and a branch of the Tonzona were crossed by us in this manner. The Ecolena we crossed by riding over on the horses behind the packs. Where practical, we usually cut a large spruce tree to fall across so as to make a foot log, on which we crossed while the horses swam over.

The general characteristics of interior Alaskan rivers are strong currents, great erosion and sedimentary deposits, shifting channels, and rapid rise and fall in the spring. They are frozen from about November 1 to about May 1. The flowing ice runs during the months of May and October. The rivers are open to navigation about June, July, August, and part of September. The floating ice at the mouth of the Yukon usually delays navigation there until about the 1st of July. The steamboats used are stern-wheel, flat-bottom, light-draft, with powerful engines and wood-fired boilers. They are rigged with spars and tackles, steam winches and hawsers, for getting off bars by sparring or warping and for warping against strong currents.



Photograph No. 26.—Ice Cakes at the Break-up of the Yukon.

The highest water occurs in May, during and just after the running of the ice. The rivers drop with astounding suddenness, one or more inches an hour, after the snow in the valleys is gone. The ice runs in May and October. In May it breaks up and runs out, the small streams and head waters opening up first. In October the ice forms near the shore, portions breaking loose and filling the river with floating ice. The rivers close by the shore ice widening and blocking the channel and the jamming and freezing solid of the floating ice.

Travel over the ice begins about November 1. The steamboats winter in the mouths of small branch streams, to be safe from the flowing ice (photograph No. 26) in the spring.

MOUNTAINS.

Augustin Peak.
Bitz-ish-ti-nee.*
Clate-ech-li-nich.*
Ches-nic.*
Chit-an-at-ala.*
Cone Hill.
Foraker.
Gurney Peak.
Ha-tay.*
Lewis Peak.
McKinley Range.
Mun-sat-lee.*
Nu-chu-sa-la.*
Shiss-loy-so Hills.*
Sis-chu.*
Snee-dee.*
Tlis-kon.*
Ton-ta-tin.*
To-toy-lon.*
U-it-oh Hill.
Un-suz-ee.*

My observations on the west and those of Mr. William Morey, jr., of the Suchitna detachment, on the east of that part of the great range lying southwest of the Cantwell or Nenana River, heretofore called generally a part of the Alaskan Range, have convinced me of the utility of a separate designation. The distinct break at the Nenana or Cantwell River makes the mountains southwest a separate range by physical conformation, while the direction of their trend and their situation as the Suchitna-Kuskokwim divide make them a separate range by geographical location.

The mountains heretofore denominated the Alaskan Range are so extensive that the name "Alaskan Range" was indefinite. Mount McKinley, celebrated as the highest mountain of North America, being a peak of the range in question, the name "McKinley" for the range as well as the peak at once assigns a definite and appropriate designation.

I enjoyed unequalled advantages for observing the McKinley Range for months. The view from the west has the advantage of having no intervening mountains to obstruct it.

I discovered a second great mountain in this range, 20,000 feet high, which I named Mount Foraker.

From the vicinity of Lake Minchumina I made a sketch of the entire range. This sketch is a part of this report.

The Indians have three names for these two mountains. The Suchitna tribe call them "Bolshoi," the Russian word meaning "big." The Kuskokwims call them "Din-az-ee," the Tananas and Yukons "Din-al-ee."

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* The Indian name.

GLACIERS.

Caldwell.
Fleischmann.

The route passes near these, but does not touch them. They at one time ground out the valleys and the pass which now open a way through these mountains.

PASSES.

Simpson. (See sketch.)
Ha-tay—Snee-dee.
Cos-na—Kuskokwim.

My Suchitna Indians showed me the mountains Hatay and Sneedee and acquainted me with the pass between them. The Indian trail to Tyoonok runs through this pass. This pass adds to my route the advantage of a direct all-land connection with Tyoonok. This, with a short extension along the coast to a point below the west Foreland, such as Kustatan, makes possible an open harbor free from ice all year around, and a direct overland route into the interior and center of Alaska.

My pass over the divide through the McKinley Range, which I named Simpson Pass, opens a way to the Yukon, Kuskokwim, and Cape Nome countries. I judged the pass to be from about a quarter to about a half mile in width. It is of slight grade, free from glaciers, safe from snow slides, the elevation on the crest 3,600 feet above sea level, and is approached by broad valleys. It is a wide gap cut out in former ages by the Fleischmann Glacier, which has receded and now stands back and out of the pass.

The Kuskokwim-Cosna Pass is low and of easy grade, and lies between small hills.

LAKES.

Hoyle.
Kin-ku-tum-ina.*
Klu-klats-o-dom-ino.*
Min-chu-min-a.*
Telida.*
Tu-ca-omina.*

The largest and most important lake in this part of Alaska is Minchumina. It is peculiarly situated close to the Kuskokwim, but drains into the Nitzutaleena, thence into the Contaythno (Toclat), a tributary of the Tanana. A short portage between Minchumina and the Kuskokwim results from the extraordinary invasion of the former into the latter's territory, and the Indian canoe route between these waters is via this portage.

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* The Indian name.

AVAILABLE ROUTES OF TRAVEL.

There are only two established freight and passenger routes to points in the Yukon country. The first is by ocean steamer from Seattle or San Francisco to St. Michael, thence by river steamboat up the Yukon, available only about three months in the year. The second is by ocean steamer from Seattle or San Francisco to Skagway, thence about 100 miles by the White Pass Railroad to White Horse, thence by river steamboat down the Lewes River and down the Yukon. The steamboat portion of this route is available only about four months in the year.

This Canadian route is the only established winter route for public travel to all points in Alaska on the Yukon River and to Cape Nome—Bering Sea being closed with ice—but it involves a sled journey over the ice the entire length except the 110 miles covered by the railroad, or about 1,500 miles to St. Michael or Cape Nome. The winter sled trail leaves the river at Nulato and makes a portage to Unalaklik, thence follows near the coast to St. Michael or Cape Nome.

The objections to the Canadian route are that it is foreign territory, with all that that implies, and the fact that after having traversed the 600 miles of its length one has arrived only on the border of Alaska.

To find an available all-American route into the center of Alaska from the open harbor of Cook Inlet was the primary object of my exploration.

I submit the following natural advantages and disadvantages of the route exploited by me and shown on the maps accompanying this report. It pierces the center of Alaska. It touches navigable points and winter trails on the most important river systems of Alaska, namely the Suchitna, Kuskokwim, Tanana, and Yukon, and, as a consequence, taps the country drained by them, the most resourceful and promising of Alaska, and connects with Nome.

The broad valleys of the Keechatno, Tateno, and Echeatnu, and the wide and low Simpson Pass, constitute an easy gateway through the McKinley Range. Three hundred and forty miles of this route were tested practically by taking my pack train over it, which speaks for itself as to that portion of the trail. The remainder, traversed on snowshoes, I found to be rolling and firm terrain, with a low divide, a few hundred feet and easy grade between the Kuskokwim and Cosna and no obstacles to that portion of the route.

The terrain from the point where I abandoned the horses to the Yukon was the most favorable for travel of any that I had seen on the trip. For summer travel the trail would take the west shores of Lakes Minchumina, Telida, and Kinkutumina and the left-hand bank of the Tanana.

Abundant spruce timber along the route will furnish spars and timber for bridges, buildings, and fuel. Spruce growing about 2 feet in diameter and about 100 feet high are common along the Tonzona, Chedotlothno, Shissnona, Hitzeecolochna, Tatlathno, and Upper Kuskokwim.

For winter travel there are no warm Chinook or Japanese winds to soften the trail. The Indian trail cut-off through the Hatay–Sneedee Pass gives the added advantage of an all-land connection with Cook Inlet. Its ocean terminus, Cook Inlet, is partially inclosed by the populous and industrial Kenai Peninsula and Kadiak Island, the great agricultural, stock-raising, cannery, coal, and fur-trading regions of Alaska.

The arguments contrariwise touch only the initial point of the route, Tyoonok, which for about four months in the year has the defect of floating ice in the anchorage and channel approaches. This objection does not apply to points below the East and West Forelands and can be overcome by the selection of a terminal farther down the coast at some point below the West Foreland, such as Redoubt Bay of Cook Inlet, situated less than 40 miles south of Tyoonok. Kustatan is favored with a superior, 10-fathom, sheltered harbor, free from ice all the year, and is easily accessible by land from Tyoonok.

Kustatan is situated in a coal region, is used as a cannery station, and has one of the best harbors in Alaska.

Mr. William Morey, jr., civil engineer of the expedition, investigated this Redoubt Bay terminus for the route, and I am indebted to him for the solution of the floating-ice problem.

The rough trail selected, cut out, blazed, corduroyed, bridged, or otherwise put together, at great pains by myself and my men during nearly six months in the interior, must necessarily, owing to our small number, be as yet more or less crude, and before permitting its use for public travel, working parties should go over it a second time, preferably operating from both ends. The trail should be straightened, unmistakably marked, and carried around the lakes or river bars of which I took advantage, so it may be available at all seasons. The next step, the construction of the wagon road and railroad, can follow the same general route whenever the commercial situation shall justify the outlay. These latter, of course, will require bridges, cuts and fills, and perhaps some blasting.

Before attempting to solve the transportation problem, it is necessary to consider the extent to which the problem has solved itself thus far.

Excepting local transportation over short distances, the Alaskan people—and I might add the Siberians of the same latitude—natives, miners, mail carriers, freighters, and traders, have practically only two modes of travel in the interior—by steamboat, scow, or canoe (photograph No. 27) in summer and by sled over the frozen rivers in winter. During the months of the running ice--May and October—travel is generally suspended.

Bering Sea, the great Yukon River system, including the Tanana and Koyukuk, and the second largest Alaskan river system, the Kuskokwim, afford the best and cheapest summer transportation into the interior of Alaska, and it is all American. The steamboat service on the Yukon is already as well established as that of the Ohio or Mississippi. A steamboat service on the Kuskokwim awaits only the exploiting and settlement of that country, the river being navigable for large steamboats for 600 to 700 miles. No overland trail can compete with a steamboat route for summer travel. What has long been wanted, particularly since the Nome discoveries, is a short central trail from the Pacific to the interior for winter travel. At present there is only one winter trail to Central and Western Alaska in general use, a foreign (Canadian) route for about 600 miles, about 100 of which are by railroad, then about 1,000 additional miles over the Yukon ice to Cape Nome. The redeeming feature of this long and partly foreign route is safety, as mail cabins, mounted-police stations, wood-choppers' camps, traders' stores, towns, Indian villages, steamboats in winter quarters, and even road houses make a series of bases of supplies and cabins to sleep in, about 20 or 30 miles apart, almost the entire length of the route. The mail teams also keep the trails open, another enormous advantage to travelers, though hard work for the mail carriers.

Photograph No. 27.—Indian Birch-bark Canoe, Yukon River.

The old Russian winter sled trail in the southwest and west near the coast, not generally used, by way of Andreafski on the Yukon, Bethel on the lower Kuskokwim, and Katmai on the Alaska Peninsula, has been tried; but being near the coast has the defect of thaws, due to the warm Japanese air currents, in winter to such an extent as to limit its usefulness to only about two months in the year. It also has the defect of not traversing feasible ground for future expansion into a road and railroad route.

The transportation problem, which needs immediate solution, and the logical first step toward road and railroad into the interior, is the establishment of a winter sled trail, which will follow a route capable of being further developed at the proper time into road or railroad.

A winter trail is cheap, the ice bridging rivers, lakes, and swamps, and the snow neutralizing inequalities of the ground, while both snow and ice make an almost frictionless and nearly level roadbed. As long as a winter trail can follow rivers and lakes its cost is nothing, as there are no obstructions; when it traverses the land a clearing through the brush is usually necessary. In exploring my route I found that there already existed throughout its length winter sled trails cut out, blazed, and in regular use by the Indians and coinciding with or paralleling my trail throughout. I have indicated these on the maps of this report. These trails represent the result of a knowledge of the country accumulated during many generations, as well as the labor of many Indians. They follow direct lines and traverse advantageous ground. These can be economically followed, connected, plainly marked, and made ready for general use, at the same time feasible ground adjacent permits road and railroad to follow on parallel lines in due time.

A branch trail much used by the Indians leaves the Indian village on the Echeatnu for Vinasale on the Kuskokwim, and a winter sled trail leaves Vinasale for the Yukon. A winter sled trail comes into the Yukon at Nulato from the Kuskokwim. If these are joined they will connect at Nulato with the winter route to Nome and St. Michael. This, with a good supply of provisions in the store at Vinasale for a halfway base, regular steamers in Redoubt Bay, and the trail extended to Kustatan, will put this route on a business basis.

The preponderant importance of Nome and its remoteness by the Yukon trail commends its key point, Nulato, on the Yukon, as a more advantageous objective commercially than Fort Gibbon. Kustatan to Nulato by the winter sled trails mentioned herein would be about 400 miles, or about 900 miles shorter than the Yukon trail.

Indian guides, familiar with these trails, can be obtained at Tyoonok, the Indian village on the Echeatnu, Vinasale, and Nulato.

FEASIBLE ROUTES FOR RAILROAD CONSTRUCTION.

The commercial importance of Nome seems to be already tempting capital toward railroad investment there. A preliminary survey is reported to have been made by one of the transportation companies and a feasible railroad route found between Nome and Nulato.

A good pass is reported to exist in the low Kaiyuh mountains near Nulato; this, the Simpson Pass, already described, the Hatay-Sneedee Pass, the Kustatan Harbor, and the favorable intervening country all tend to the conclusion that the way is open there for a Pacific short-line railroad to Nome, and judging by the Canadian Railroad this one should prove a profitable proposition.

APPROPRIATE AND AVAILABLE SITES FOR MILITARY RESERVATIONS.

According to the present outlook, reservations for military purposes will probably be needed in the not distant future at or near Vinasale, Kustatan, and Nulato.

ADAPTABILITY FOR AGRICULTURE AND STOCK RAISING.

Alaska is adapted to the raising of potatoes, cabbage, celery, turnips, beets, lettuce, carrots, radishes, onions, and pease as far north as the Yukon. Cranberries, huckleberries, red raspberries, currents, and moss berries grow wild. An edible root called "tray-lah," and an edible stalk called "gaess" by the Indians, grow wild. Red-top grass is abundant on any drained, open ground, and if cut and properly stacked it makes good hay, but does not cure otherwise. This seems to be about the limit of agriculture to date, as far as my observations extend.

The Cook Inlet and the Kuskokwim regions seem to be the most fertile of Alaska. Horses, cattle, sheep, and other stock can be raised, but require shelter and feed in winter. In summer grazing will sustain and fatten stock. The reindeer can be raised in certain localities, and as the white man is invading the hunting grounds and curtailing the game supply, reindeer introduction for breeding purposes for food opens an occupation for the Alaskan native. Chickens on the Yukon thrive and lay through the winter in a warmed coop.

Agriculture and stock raising, on a small scale, have been heretofore only profitable diversions, and large farms or ranches are not yet practicable in the interior.

MINERAL RESOURCES.

Very hasty panning of surface gravel on some of the creeks was all the investigation time would permit on this subject. Digging to bed rock necessarily was out of the question. The best color obtained was about a five-cent piece in three pans of surface gravel from the Ecolena River.

The country in this vicinity looks well on the surface, but whether there is gold or whether there is not gold is a question that only the prospecting of a practical miner with a year's supply of "grub" can answer.

TIMBER.

The timber of the upper Kuskokwim country is superior to that of any other part of Alaska observed by me. The largest timber is found on the river banks, where one to two feet diameter spruce is abundant, and in most cases situated where it can be rafted out. The Tonzona, Ecolena, Chedotlothno, Shissnona, Hitzecolochna, Tatlathno, and upper Kuskokwim are well timbered with large spruce. This is the only timber of importance for buildings, bridges, etc. Birch grows on ridges and other drained ground and is used by the Indians for snowshoes, birch-bark canoes, bows and arrows, sleds, fish traps, bark baskets, and bark baby cradles.

In July the inner pulp of the white-birch bark is eaten raw by the Indians, who scrape it off with knives after having peeled off the outer bark. There are three kinds of birch; the white, the red, and the silver gray. The white birch furnishes the bark for canoes, baskets, etc.

Large cottonwoods are met with on the Keechatno. Alder brush 5 to 20 feet high is abundant on river banks, in ravines, and on the mountain sides. Willow brush is abundant on the rivers. Tamarack is met with in the upper Kuskokwim country. A tree, supposed to be the Balm of Gilead, is occasionally found. Stunted spruce, about 15 or 20 feet high and a few inches in diameter, occupy the plateau of the upper Kuskokwim country. Large areas of these have been burned by grass and moss fires, leaving dead forests of charred trees. On the banks of the plateau streams, however, the timber is large and abundant.

FUEL.

Coal is found in the Cook Inlet regions. I found a 5 or 6 foot vein of inferior coal in a stratum of white clay at camp, July 10, on the Keechatno.

Timber is abundant everywhere for ordinary fuel purposes.

FOOD PRODUCTS.

The interior food products are chiefly moose, bear, beaver, whitefish, salmon, pickerel, caribou, mountain sheep, rabbit, wild goose, duck, swan, crane, grouse, ptarmigan, cranberries, huckleberries, and moss berries.

STOCK BEST SUITED FOR TRANSPORTATION PURPOSES.

The stock best suited to present conditions for long-distance or cross-country travel in winter, as evidenced by its universal use, is the native-dog team, with sled.

NATIVE ALASKAN DOG.

The native dogs are sometimes subdivided as follows: Kuskokwim dog (large Esquimau or Malamute), Hudson Bay Indian dog, Hudson Bay husky (Indian dog with mastiff blood), Esquimau or Malamute dog (Bering coast), and Alaska Siwash dog (interior Alaska).

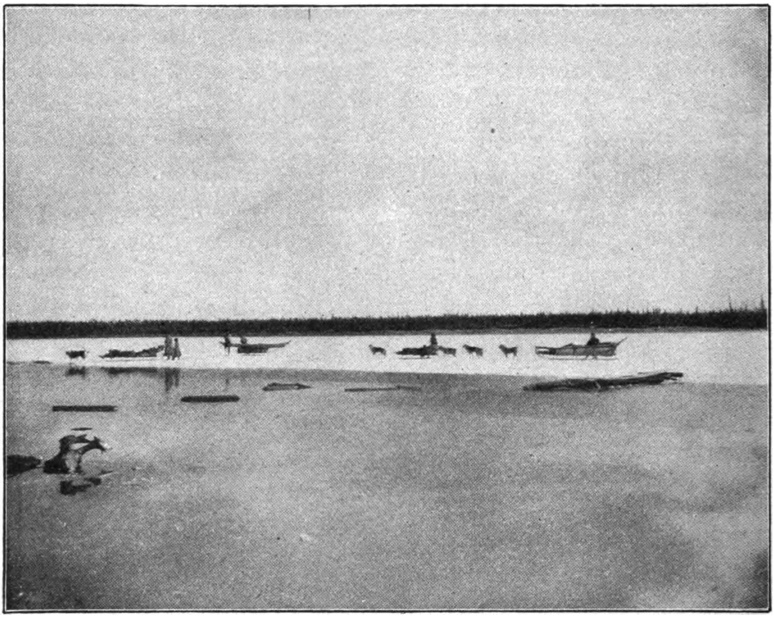
AGES FOR WORK.—Two to six years of age are the best for work. With good care and sufficient food, dogs can be worked beyond six years of age and have been useful as old as thirteen years. Proper care, such as cutting spruce boughs for a bed, will tend to prevent rheumatism and otherwise prolong his usefulness.

WEIGHT.—The average native work dog weighs about 60 to 85 pounds.

NUMBER OF DOGS TO A SLED.—Mail teams, usually five or six; freighters, seven to eleven; miners and Indians, one to five. (Photograph No. 28, page 58.)

DRAFT LOAD.—On a good trail of packed snow 100 pounds to the average dog is a moderate load; mail teams, which are fast, 75 pounds per dog; freighters, 200 pounds per dog.

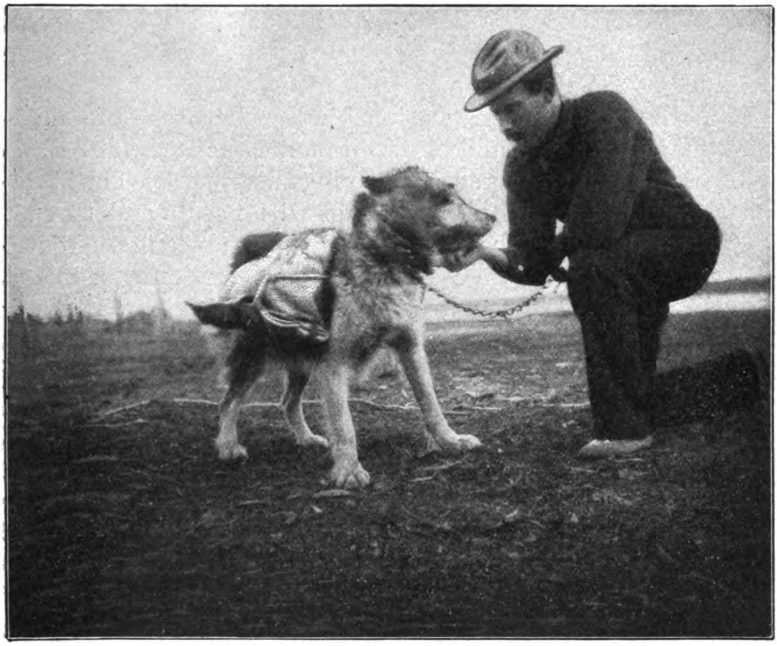
Provision is made on the sleds for a man to assist by pushing on the handle bars at the back or pulling on a rope and gee pole in front for the purpose of steering the sled and also for use, when necessary, to assist the dogs on ascending grades, as well as to hold back on descending grades.



Photograph No. 28.—Indians Traveling over the Yukon Ice with Dog Teams.

Speed.—Mail teams make about 6 to 9 miles per hour on a good trail; freighters about 2½ to 3 miles per hour on good trail. Cross-country travel varies in speed with the amount of trail breaking and trail cutting necessary, and with the nature of the grades to be overcome.

Sleds.—There are two kinds used, the basket or Indian sled and the Yukon sled. The basket or Indian sled is made of light birch sticks, lashed together with moose rawhide, usually with wooden runners, and is limited by its strength to a maximum load of about 500 pounds. This sled has handle bars at the back. The Yukon sled is made of oak or hickory bolted together, has metal runners, and is very strong. The Yukon sled usually has a gee pole in front and is used almost exclusively for freighting, and when so used for each team there are usually three sleds, two of them trailers. Metal runners reduce the friction over one-half, except when the temperature falls 40° or more below zero, when the metal runners are a disadvantage and retard the speed by adhering to the snow and ice. A piece of light canvas is usually laid in the bottom of the sled, folded over the contents and held in place by lash ropes. This prevents small articles from dropping out on the trail.



Photograph No. 29.—Mail Carrier and Pack Dog, Yukon River.

Pack Load.—Dogs are packed (photograph No. 29) to carry on their backs loads of about 25 to 40 pounds to an average dog. A couple of canvas pockets or sacks are thrown over the dog's back and lashed on with small rope, the only harness that is necessary, care being taken that the weight is balanced.

Cost of Dog Food.—Contractors for dog transportation along the Yukon the winter of 1899–1900 calculated 30 to 50 cents a day per dog for cost of food. The dog food most used in Alaska, when it can be obtained, consists of dried fish, bacon, and corn meal boiled together. Fresh fish, when fed to the dogs, should be boiled. However, in an emergency, there is no food so poor that a native dog will not eat it.

WEIGHT OF DOG FOOD.—One day's ration for one dog when working weighs about 1¼ pounds.

FACILITY OF OBTAINING DOG FOOD.—It can be obtained from the traders along the Yukon, and generally also of the Indians.

COST OF DOGS IN ALASKA.—Supply and demand and the season of the year vary the prices of dogs from $10 to $250, and even higher. In the middle of the winter of 1899–1900 good dogs sold along the Yukon for $25 to $125 each.

DOG HARNESS.—There are two kinds of harness—the Malamute harness (fig. 3) and the white man's harness (fig. 4), as shown on the diagrams accompanying this report. The Malamute harness is easily made of rags with needle and thread, but strains the dog's back and is said to produce fits. It also presses on his windpipe at the throat. These defects do not exist in properly made white man's harness, the collar being so flared and padded as to bring the pressure on the shoulders, the padding being reduced opposite the throat. Whips, but no reins or bridles, are used. Dog moccasins of drilling, with soft-tanned moose sole, are sometimes tied on a sore foot.

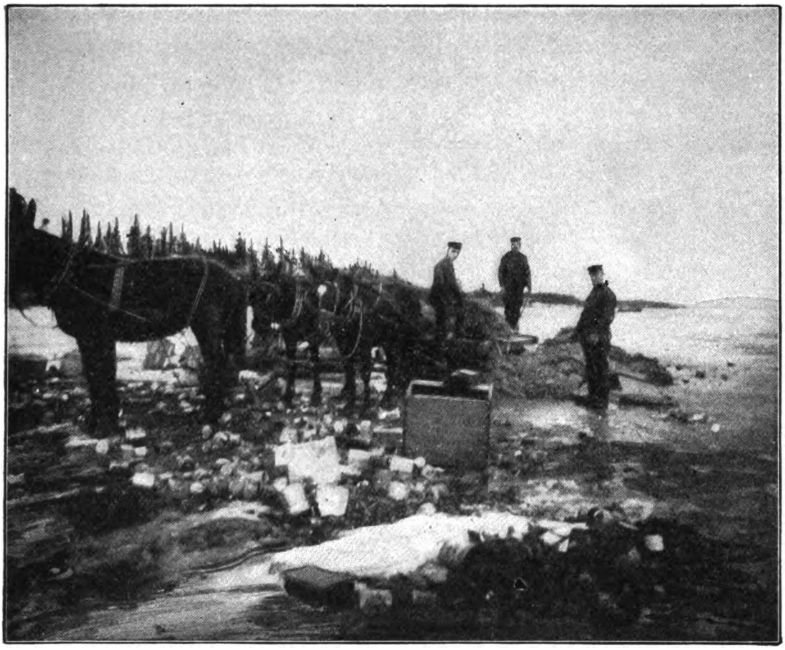
In general, the native dogs have sharp noses, elevated ears, long, coarse hair and of different colors—black, white, spotted, brown, and gray. They are very strong, enduring, and hardy, sleeping in the snow in the coldest weather. They have a fine scent and are used by the Indians to track game. They are fierce fighters with each other and in attacking game, but are docile, affectionate, and faithful with man. They are satisfied and kept healthy with a very small amount of unappetizing food.

Mail carriers, miners, and others make from 20 to 50 miles a day with dog teams over the Yukon ice after the trail is broken. The dog's fine scent enables him to keep in the trail when traveling after dark. This is important, as the winter days are very short and the snow off the trail is very deep.

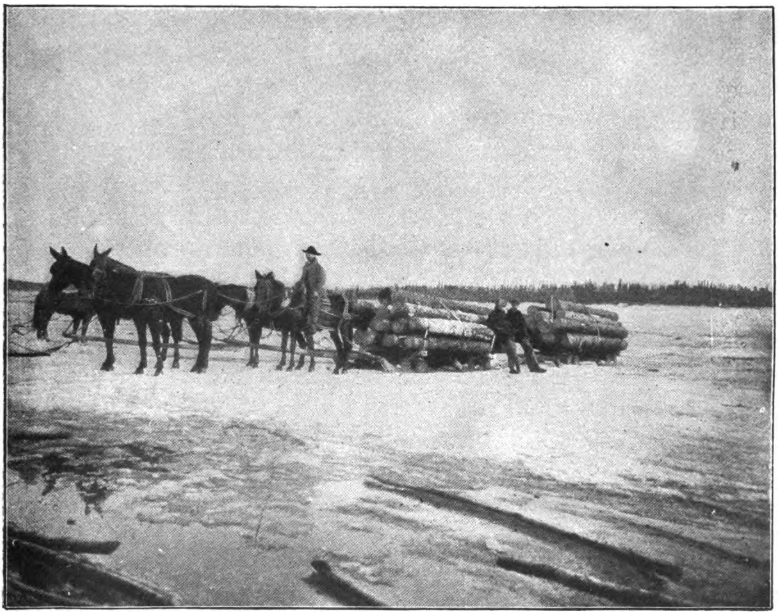
HORSE OR MULE (PHOTOGRAPHS NOS. 30 AND 31).

This transportation needs no description.

The horse or mule team and sled are superior to the dog team and sled when forage and shelter are obtainable and good



Photograph No. 30.—Horse and Mule Team and Police Sled on Yukon Ice, Fort Gibbon.



Photograph No. 31.—Mule Team Hauling Logs on Yukon Ice, Fort Gibbon.

trails are established and kept open. Three cords of wood are an easy winter load for one horse and sled on a trail of packed snow or glare ice. For hauling logs for building purposes in winter, horses or mules must be used.

There is no strain on a horse's joints or shock to the laminæ of his hoofs in trotting over ice, as, being roughshod, he never slips, while the 1½-inch wedge-shaped calks take up the jar as they punch into the ice.

The horse or mule is capable of withstanding great cold, developing a coat that adapts itself to the climate, and can be worked right through the coldest winter.

For summer overland transportation between supply bases and the mining camps on the creeks pack horses are used, such as at Sunrise to the creeks, Circle City to the creeks, Fort Yukon to the Koyukuk, and at Nome and other camps.

For summer work the horse is a better rustler for feed than the mule, particularly in the rain. The small hoof of the mule is a disadvantage when traveling over soft ground. The pack saddle is better than the aparejo for summer purposes, as swimming rivers and bogging down in swamps, both unavoidable occasionally, do not harm the pack saddle, while an aparejo would have to be set up again.

REINDEER (PHOTOGRAPH NO. 32).

The introduction of reindeer into Alaska for breeding purposes, for food, fur, and leather, is a practical charity to the natives, whose hunting and trapping grounds are being invaded by the whites. Under certain conditions the reindeer may be useful for transportation between reindeer stations near the coast. In a moss region a large herd may be driven and grazed in winter; but for general transportation purposes in the interior of Alaska the dog has proven incomparably superior to the reindeer for many reasons, a few of which are the following:

A reindeer is not much larger than a goat and can draw only about 100 pounds. He can not travel on glare ice nor run along on a thin crust of snow like the dog. His large antlers tangle him up in the brush and timber. He is nervous and excitable and difficult to manage in harness. Reindeer are attacked and stampeded by wolves and Indian dogs.

The reindeer can not feed on oats, hay, or common green moss, but only the dainty white moss. In the interior this white moss is quite inaccessible, and is usually found only on the hills and mountain sides. The traveled routes are not in the hills, but in the valleys and over the ice of the rivers. The great argument for reindeer has been that no feed need be carried, and the impression obtains that he will quietly graze around camp wherever it may be pitched in Alaska. Reindeer can not be promiscuously turned out to graze anywhere, for the reason that there may be nothing for them to graze on, and for the reason that if only a few of them be turned out, they will promptly leave the country. Only large herds, 50 or more, will stay together, and they must be herded where the moss grows and guarded from wolves or they will stampede.

Photograph No. 32.—Laps, Reindeer, and Reindeer Sleds.

A search for reindeer moss is complicated by the mantle of snow over the country and the darkness of winter.

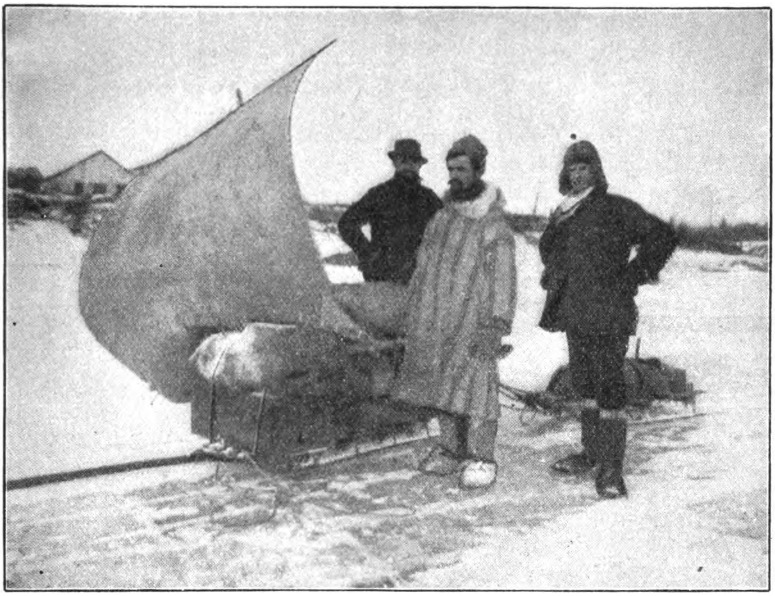
Much heroic and thankless work has been done by humble and obscure Lap reindeer herders, in racing many miles across country on snowshoes after runaway reindeer.

Miners, mail contractors, freighters, and traders in the interior of Alaska, the men who actually travel and are on the ground and whose interests are involved, all condemn reindeer transportation in the strongest terms. Even some of the Lap reindeer herders informed me that dogs were better than reindeer. I will cite one example. A herd of about 80 reindeer arrived at Tanana, Alaska, the winter of 1899–1900, after having been nearly two years coming from Dyea, in charge of four Laps, with two herd dogs. These deer were all that had survived of a herd of about 500 brought from Norway and landed at Dyea in 1898. After its arrival at Tanana it was necessary to keep this herd about 15 miles away on the nearest moss grounds, and it required the constant service of Laps and herd dogs, assisted part of the time by white men and an Indian. Dog teams carried supplies to the herders from Tanana. A thorough and practical test of the reindeer as a means of transportation was made here by experienced Alaska business men, utilizing the services of the Lap reindeer herders. The deer proved failures, were slaughtered, and the Laps discharged. Reindeer transportation might have a limited use in the interior if good trails were made, with relay stations every 25 miles, where herders, feed, and fresh animals could be obtained. But if this were done, dogs would still be better and cheaper than deer, while horses or mules would be better and cheaper than either. Reindeer for transportation can not compete with horses in Alaska any more than they can in the United States.

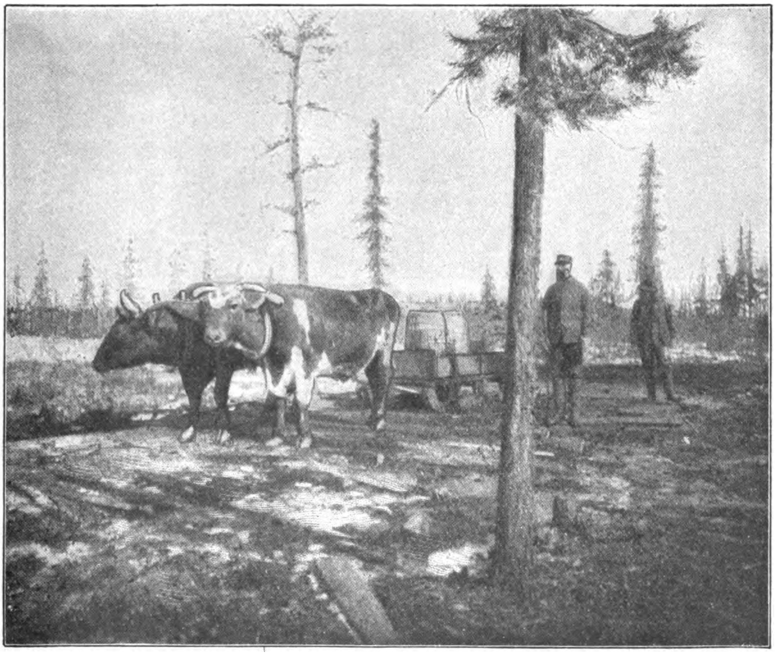
NOTES.

During the winter of 1899–1900, hundreds of miners and others, mostly from Dawson, traveled over the Yukon winter trail to Nome. All used dogs and sleds except one party, which used horses, six rode bicycles, a few drew their own sleds, which were equipped with sails (photograph No. 33) and assisted by the wind, which habitually blows down the Yukon valley in winter, and two walked down, with no transportation, making towns or cabins each march. The success of the bicycles with the ordinary rubber tires suggests an automobile or traction engine, with wood-fired boilers, as a possibility of the future.

Moose transportation does not exist. Burros have been used, but are too small, and are said to be afraid of water. Oxen or steers are used for short hauls (photograph No. 34).



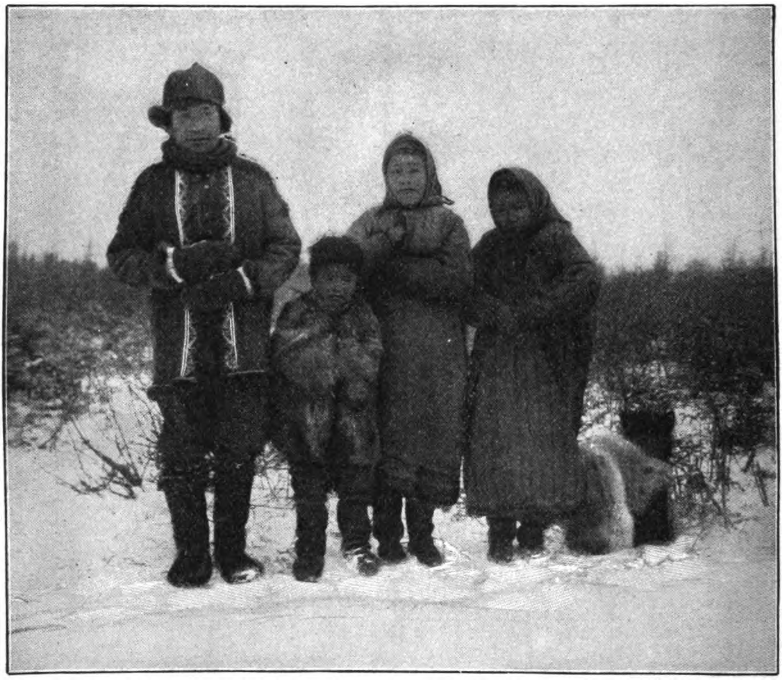
Photograph No. 33.—Hand Sled, with Sail, on Yukon Ice.



Photograph No. 34.—Steers and Sled, Fort Gibbon.

THE NUMBER, LOCATION, AND CONDITION OF THE NATIVES IN THE TERRITORY EXPLORED.

The natives of the countries explored by me are Indians and belong to the family of Athabaskans. Their traditions say that they came down the rivers. They are related to the Apaches of Arizona, have similar words in their language, and resemble them in appearance and customs. There are about 200 at Tyoonok, Suchitna Station, and vicinity. There are about 20 located at the village on the Echeatnu, at the mouth of the Tonzona.



Photograph No. 35.—Bacilli; Son, Uruska; Wife, Barian; and Annisa, of Telida Village.

The names of the men of this village are:

Nikoli (chief).
Dia-sohn.
Mit-ar-uska.
Bacilli.
Kur-gur-vey.
Soy-on.

The population of the Telida village, on the Tatlathno, is as follows, by families:

Shesoie, man, age about 30 years.
Barian, wife of Shesoie, age about 25 years.
Annisa, daughter of Shesoie, age about 12 years.
Gara, son of Shesoie, age about 5 years.
Infant child of Shesoie, age about 6 months.

Bacilli, age about 35 years (photograph No. 35).
Barian, wife, age about 20 years.
Uruska, son, age about 5 years.
One son buried at Telida.

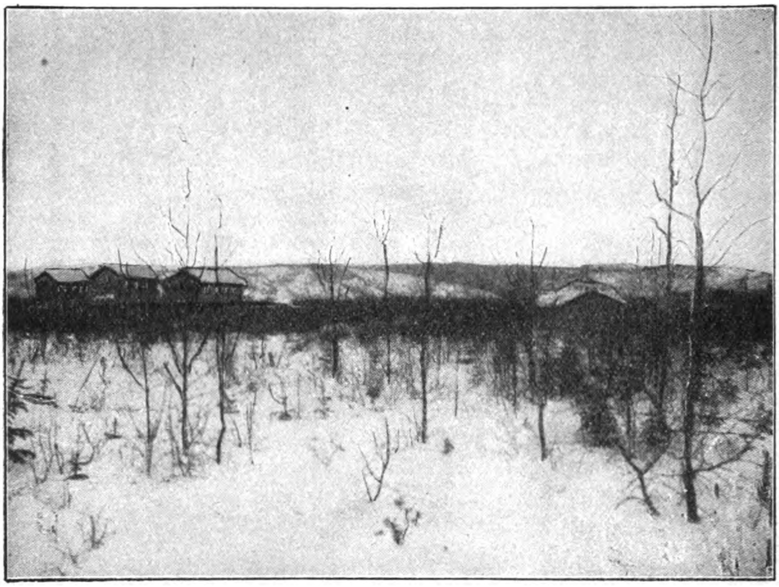
Tenesche, man, age about 35 years.
Annisa, wife, age about 30 years.
Eulian, son, age about 16 years.
Andre, son, age about 10 years.
Kurgurvey, son, age about 8 years.
Eleana, daughter, age about 5 years.

Rubber Indian, man, age about 25 years.
Yocutter, wife, age about 20 years.
Wastinia, infant son, age about 6 months.

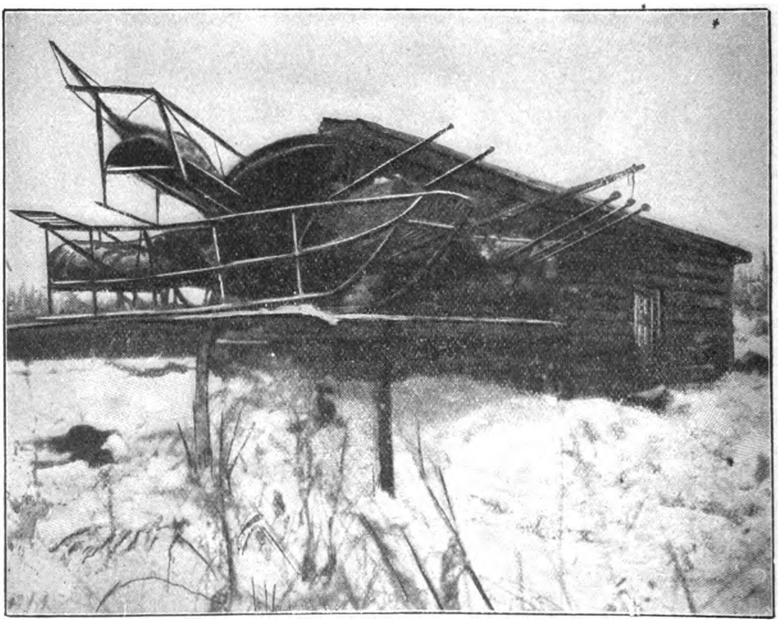
In the vicinity of Lake Minchumina is a village or camp of about 15 Indians, including the following:

Minchumina Ivan, man, age about 50 years.
How-rah-hurna, wife, age about 35 years.
Ana-buella, wife, age about 40 years.
Er-uck-sa, son, age about 16 years.
Amelia, daughter, age about 12 years.
André, medicine man, age about 30 years, and family.
Oolin, man, age about 30 years, and family.

Coschaget, on the Tanana, consists of two comfortable cabins and some caches (photographs Nos. 36 and 37, page 68) belonging to Hosa and John, Tanana Indians, each with a wife and several children. About twenty other Indians were camped there when I arrived. It should be borne in mind that these Indians roam over the country hunting and trapping and make semiannual trips to the traders' stores at Tyoonok, Ladds, Suchitna Station, Vinasale, Weare, Tanana, or Rampart, so that the villages may be deserted for months at a time. The houses at the village on the Chedotlothno belong to the Telida Indians.



Photograph No. 36.—Coschaget, on Tanana.



Photograph No. 37.—Hosa's Cabin at Coschaget.

The interior Indians are strong, healthy, and possess great endurance; are a trifle under medium stature, good-looking, moderately intelligent, hospitable, and comparatively honest. Morally they substitute expediency for right and have no moral principles. The old Indian in photograph No. 38 ate his wife and others some years ago while out of food and starving in the interior. They suffer from rheumatism and occasionally consumption, and age rapidly, due to the exposure and hardships of their life. One woman at Telida had consumption. They take frequent steam baths and are anxious to procure soap when they can. Their steam baths are similar to those of the plains Indians, their method being as follows: Rocks in a tent or small low log shack are heated by building a fire under them, while a fire outside heats water in kettles. The embers are then raked out from under the heated rocks, which generate the steam when the hot water is thrown upon them, the tent or shack being tightly closed.

NORTH AMERICAN TRANSPORTATION & TRADING CO
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Photograph No. 38.—An old Yukon Indian, who ate his wife and others, some years ago, while out of food and starving in the interio

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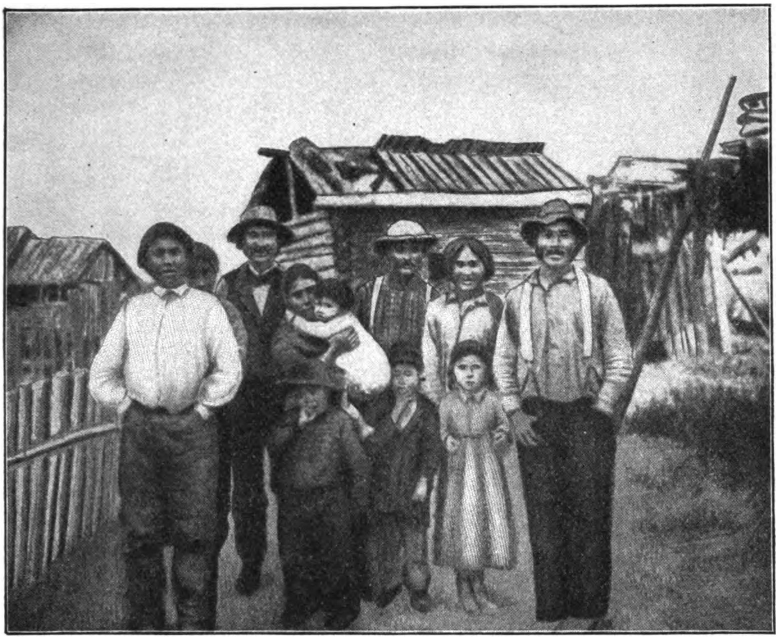
By exercising phenomenal energy and ingenuity the Indians manage to obtain a bare subsistence by hunting and trapping game and trapping fish. Owing to the uncertainty of game, they are always more or less in danger of starvation.

The furs and skins of the bear, beaver, marten, otter, mink, fox, wolf, moose, caribou, ermine, and other animals are traded at the stores for axes, guns, ammunition, and steel traps, and when they can afford it, also tea, canvas, sheet-iron stoves, cooking utensils, flannel, needles, calico, thread, knives, cross-cut saws, flour, and soap. They mold their own bullets and reload their cartridges. They save and remold the bullets from the carcasses of game. The amounts received by them for furs are very low—about $5 for bear or beaver, about $2 or $3 for marten, and so on; while the prices charged them for supplies are stupendous—about $10 a sack for flour, about $25 for a sheet-iron stove, and so on, so that a hard season's hunting and trapping net meager returns in trade.

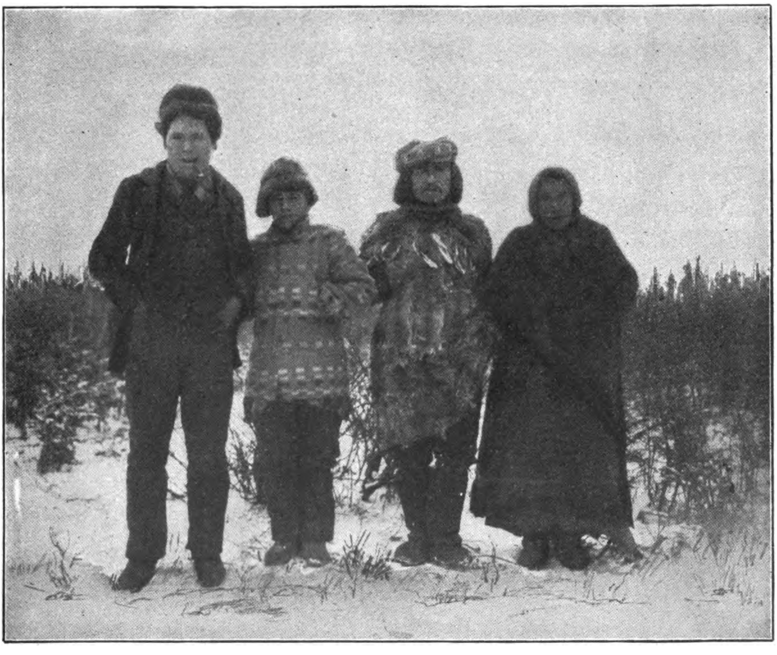
The traders are opposed to any Government aid for the Indian on the grounds that he will stop hunting and trapping, which is undoubtedly what would happen, but the game and fur animals will diminish with the advent of the white man and some help will soon be right and just, particularly for the old, blind, and sick Indians. The young men along the Yukon make money as pilots, woodchoppers, and guides.

The Indians have traditional stories relative to the origin of all things in nature wherein the crow, the bear, the beaver, and other animals, also the mosquito, each act a part, some performing feats and miracles, intriguing and scheming for or against the Indians or each other, and displaying the traits of the gods of mythology. These stories have been disparaged by the missionaries to clear the way for Bible stories, and only the old Indians retain them in full and are reluctant to talk on the subject.

The Echeatnu, Telida, and Minchumina Indians still have their medicine man, who attempts to heal the sick by chants similar to those of the plains Indians, and by rolling about, striking blows at and parrying blows from an imaginary antagonist, blowing occasionally on the seat of the injury or disease he seeks to cure, and by beating a tom-tom. The tom-tom is rawhide stretched on a circular frame about 18



Photograph No. 39.—Group of Suchitna Indians.



Photograph No. 40.—Three Minchumina Indians to the right of picture. Boy to the left, Yukon Indian.

inches in diameter, has a sun with rays painted on its face, and is beaten with a bundle of three or four sticks about 2½ feet long.

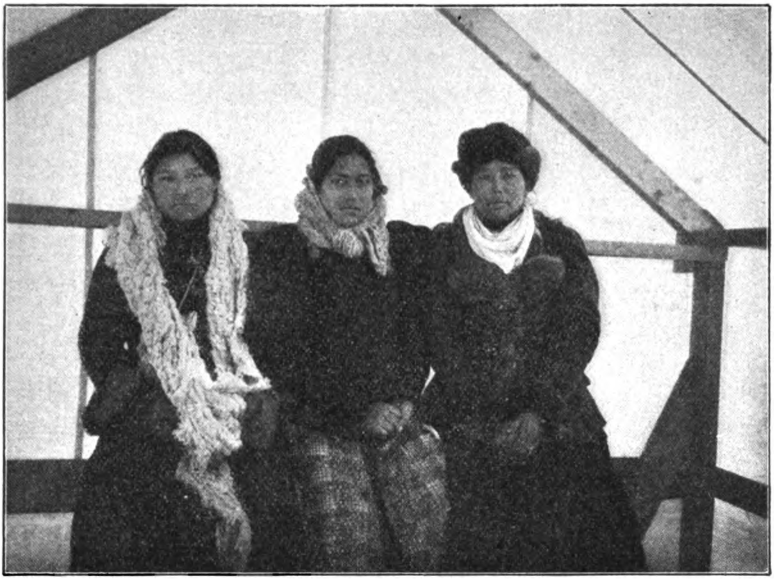
A few Upper Kuskokwim Indian words, spelled phonetically:

Shiss (bear).
Tzock (beaver).
Biz-ay-yaw (otter).
Citz-ay-attle (steel trap).
Chy (tea).
Goossen (want).
Ge-cotch-ina (moccasin).
Do-gach (shirt).
Dun-ay-chee (moose).
Bitz-ish (caribou).
So-gee (marten).
Mully-high (cap.)
Aush (snowshoes).
Hoot-lth (sled).
Ah-stein (wood).
Tso-bah (window).
Kay-etch (birch bark.)
Chin-chech (nose).
Chin-chugah (ear).
So-lah-gah (eyes).
Gitz (glove).
Telia (fish).
Kohn-ee-say (squirrel skin).
Mush-lah-dah (sleep).
Mer-cas (boat).
John-a-hah (I give you present).
Quash (stone to sharpen knife).
Clay (cold).
Quant (fire).
Toe (water).
Trut (spruce).
Clesh (birch).
Year-sage (box).
Mahl-doo (coat).
Yoke (beads).
Clear-kah (dog).
O-culah (all gone).
Guano (thanks).

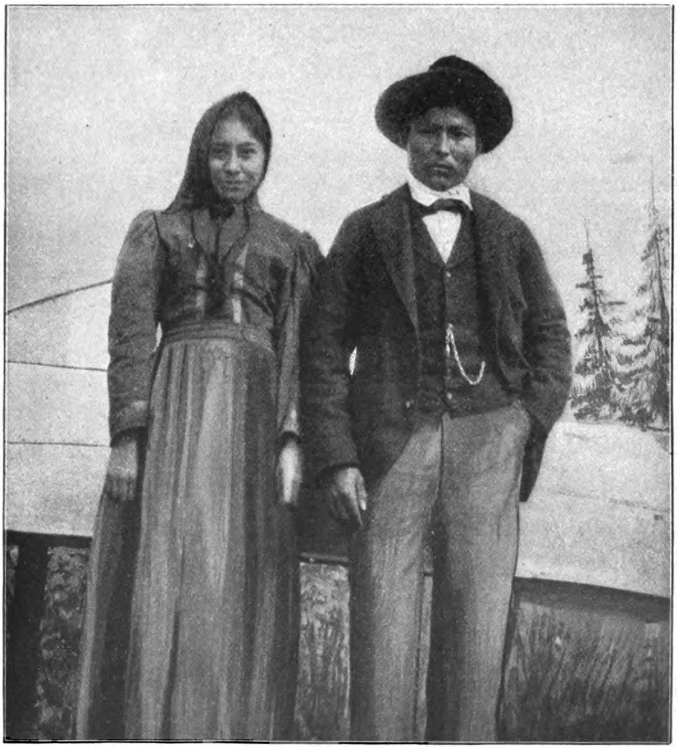
The Suchitnas (photograph No. 39, page 71), Kuskokwims (photograph No. 35, page 66), and the Yukon and Tanana Indians (photographs Nos. 41 and 42) speak different languages, or different dialects at least, but have many words in common and many that differ only in the sound of certain syllables. They have no difficulty in understanding each other. None of these Indians understand the sign language of the plains Indians. Their word for the United States is "Seattle."

SPECIMENS OF PLANTS COLLECTED.

I collected and brought out specimens of plants for the United States Department of Agriculture, which have been



Photograph No. 41.—Matilda, Koyukuk Indian (to the left of picture), and Jenny and Ellen, Yukon Indians.



Photograph No. 42.—Liness, interpreter at Fort Gibbon, and wife, Yukon Indians.

analyzed and listed by the Botanical Division of that Department, Mr. F. V. Coville, botanist, as follows, and have been mounted and placed in the National Herbarium:

POLYPODIACEÆ (FERN FAMILY).

Athyrium cyclosorum Rupr.
Collected on Keechatno River, July 7.

EQUISETACEÆ (HORSETAIL FAMILY).

Equisetun arvense boreale (Bong.) Maxon.
Equisetum boreale Bong., St. Petersb. Acad. Sci. Mem. 2: 174. 1833.
Collected on Echeatnu River, July 31.

PINACEÆ (PINE FAMILY).

Larix laricina (Du Roi) Koch. Tamarack.
Largest tree 30 feet high and about 8 inches in diameter. Not abundant. Collected in upper Kuskokwim country, August.

POACEÆ (GRASS FAMILY).

Calamagrostis langsdorffii Trin.
Much eaten by horses. Collected on Keechatno River, July 7. Known as "bluejoint" or "redtop."

LILLIACEÆ (LILY FAMILY).

Kruhsea streptopoides (Ledeb.) Kearney.
Smilacina streptopoides Ledeb. Fl. Ross. 4: 128. 1853.
Collected on Keechatno River, July 7.

BETULACEÆ (BIRCH FAMILY).

Betula glandulosa rotundifolia (Spach) Regel. Bog birch.
Upper Kuskokwim country, August.

ALSINACEÆ (CHICKWEED FAMILY).

Arenaria macrocarpa Pursh.
Collected on Keechatno River, July 18.

RANUNCULACEÆ (BUTTERCUP FAMILY)

Aconitum delphinifolium DC. Monkshood.
Kuskokwim to Keechatno country.

CRASSULACEÆ (STONECROP FAMILY).

Sedum roseum (L.) Scop.
Collected on Keechatno River, July 18.

SAXIFRAGACEÆ (SAXIFRAGE FAMILY).

Parnassia plaustris L.
Collected on Kuskokwim River, July 31.

RIBACEÆ (CURRANT FAMILY).

Ribes laxiflorum Pursh. Currant.
On Keechatno River, July 7.

Ribes rubrum L. Red currant.
Upper Kuskokwim country, August.

ROSACEÆ (ROSE FAMILY).

Rubus arcticus L. Arctic raspberry.
Upper Kuskokwim country, August; and on Keechatno River, July 7.

Rubus chamœmorus L. Cloudberry.
Upper Kuskokwim country, August.

VICIACEÆ (VETCH FAMILY).

Lupinus arcticus Wats. Lupine.
Keechatno River, July 18.

Aragalus campestris (L.) Greene.
Horses very fond of it. Echeatnu River, August 15.

Hedysarum americanum (Mx.) Britton.
Traylah of Suchitna Indians. Roots eaten by the Indians raw, and cut up and eaten with moose grease. Collected on the Tateno branch of the Echeatnu River, July.

Hedysarum mackenzii Richards.
Much eaten by horses in absence of grass. Collected on Echeatnu River, July 31.

GERANIACEÆ (GERANIUM FAMILY).

Geranium erianthum DC.
Collected on Keechatno River, July 7.

VIOLACEÆ (VIOLET FAMILY).

Viola langsdorfii Fisch.
Collected on Keechatno River, July 18.

APIACEÆ (CELERY FAMILY).

Heracleum lanatum Michx. Cow parsnip.
Gaess of Suchitna Indians, who are very fond of the stalks, which they eat without cooking, as we use celery. The root is used as medicine.

VACCINIACEÆ (HUCKLEBERRY FAMILY).

Vaccinium uliginosum L. Bog huckleberry.
Upper Kuskokwim country, August 16.
Vaccinium vitisidœa L. Bunch cranberry.
Upper Kuskokwim country, August.

ERICACEÆ (HEATHER FAMILY).

Ledum grœnlandicum Oeder.
Collected on Echeatnu River, July.
Phylladoce cœrulea (L.) Gren. and Godr.
On Keechatno River, July 18.

PRIMULACEÆ (PRIMROSE FAMILY).

Trientalis europœa L. Starwort.
Collected on Keechatno River, July 7.

POLEMONIACEÆ (POLEMONIUM FAMILY).

Polemonium cœruleum L.
On Keechatno River, July 18.

VIBURNACEÆ.

Linnœa borealis L.
Collected on Keechatno River, July 18.

CARDUACEÆ (THISTLE FAMILY).

Arnica lessingii (T. and G.). Greene.
On Keechatno River, July 18.
Aster sibiricus L.
On Kuskokwim River, July 31.

KOYUKUK PAPERS.

Upon my arrival at the Yukon I found that the Koyukuk boom of 1898–99 had collapsed the summer of 1899, and that Mr. J. Dietrick's letter and accompanying papers no longer pertained. A new Koyukuk boom was started in the spring of 1900, but it had no connection with Mr. Dietrick's papers. I indorsed the papers to this effect and returned them to the Adjutant General of the Army through the headquarters of the District of North Alaska.

CONCLUSION.

The party is indebted to the following gentlemen for courtesies in Alaska and en route home:

Messrs. Cleghorn, Belt, Corbusier, Wines, Baker, Moran, Dunlap, Prevost, Seldon, M. E. Bray, W. J. Dodson, Hastings, Menzies, G. K. French, Bennett, T. C. Healy, the members of the Dawson Club, Lieutenant Colonel Hemming, of the Canadian army, the Northwest Mounted Police, the editor of the "Daily Alaskan," Skagway, and many others.

BAROMETER AND PSYCHROMETER RECORD.

Time.	Date.	Aneroid barometer.	Psychrometer.	
			Wet bulb.	Dry bulb.
	1899.		°	°
5.00 p. m. (Suchitna Station)	June 14	*29.81	55.	75.
10.00 a. m. (Tyoonok)	June 24	†29.79	55.	57.5
7.45 p. m. (Keechatno)	July 1	29.98	51.	52.5
4.45 p. m	July 2	30.12	52.5	57.5
9.00 p. m	July 3	30.06	49.	58.
8.30 p. m	July 8	29.04	54.5	58.
3.30 p. m	July 14	29.16	55.	68.
9.30 a. m	July 22	28.17	48.5	53.5
3.30 p. m. (top of Divide)	July 22	25.88	42.5	44.
8.30 a. m	July 23	27.14	44.	45.
7.30 a. m	July 25	27.98	49.5	54.5
7.00 a. m	July 26	28.58	50.	52.
10.00 a. m	July 28	28.86	59.5	67.
9.00 a. m	July 30	28.70	60.	69.
8.30 a. m	Aug. 2	28.38	52.	63.5
10.00 a. m	Aug. 7	29.08	54.	60.
10.00 a. m	Aug. 14	28.90	51.5	58.
8.15 a. m	Aug. 16	28.94	47.5	48.
8.45 a. m	Aug. 17	29.18	47.5	50.5
8.45 a. m	Aug. 18	29.42	43.	44.
11 00 a. m	Aug. 20	29.22	51.	54.
9.55 a. m	Aug. 25	29.44	47.	50.
8.00 a. m	Aug. 31	29.80	51.	51.
7.55 a. m	Sept. 1	29.58	40.	40.5
7.30 a. m	Sept. 3	29.06	42.	43.
8.45 a. m	Sept. 4	28.80	52.	55.
8.00 a. m	Sept. 6	28.84	47.5	47.5
8.00 a. m	Sept. 8	28.46	43.	46.
10.45 a. m	Sept. 9	28.48	48.5	54.
8.30 a. m	Sept. 12	28.90	42.	42.5
7.50 a. m	Sept. 13	28.70	36.5	37.
5.30 p. m	Sept. ‡15	29.26	39.5	44.5

* Suchitna River. † Sea level. ‡ Barometer broken from here; no further record.

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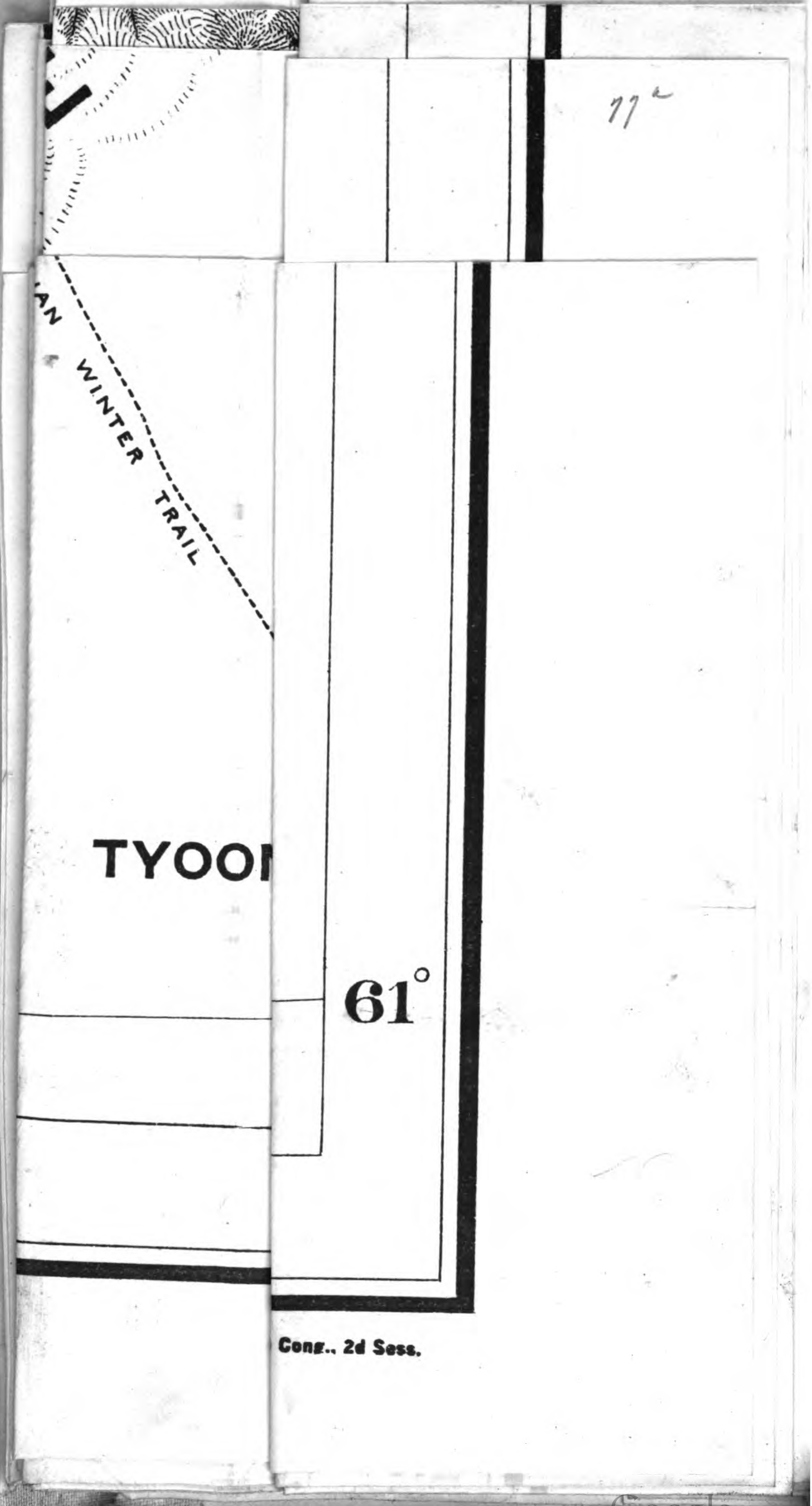

Cong., 2d Sess.